TROPICAL DISEASES BUREAU.

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PROTOZOOLOGY.

LYNCH (Kenneth M.). **Dauercystformation of** *Trichomonas intestinalis.* —*Jl. Parasit.* 1916. Sept. Vol. 3. No. 1. pp. 28–33. With 12 text figs.

The parasite was studied in a male negro patient in South Carolina, who was in hospital with chronic endocarditis and gave no history of dysentery. *Trichomonas intestinalis* was the only Protozoon present in the patient's stools and there was no Blastocystis therein. The flagellate averaged 8μ by 12μ, with constant undulating membrane, three flagella and a stiff spine projecting posteriorly. The nucleus was indistinct in the fresh state. Cysts of Trichomonas were also present and are thus described as seen in fresh preparations :—

"The encysted form is almost as numerous as the active and commonly exhibits a tendency to occur in pairs. It is about three-fourths the size of the active, of a typical pear shape, and has a transparent shell of uniform thickness. The enclosed parasite has a regular ovoid contour and a finely granular grayish appearance. On one side nearer to the small end the nucleus is visible as a refractive granule, and on the other the undulating membrane is seen as a refractive wavy line extending from end to end."

From observations on iron haematoxylin stained preparations the cyst is stated to be about 6μ by 8μ. There is a slight projection at the anterior end. "A fine dark line beginning as a granule in the anterior end runs directly backward to the posterior end. This I take to be the stiffening rib of the undulating membrane because of its close association in origin and termination with that organ. The undulating membrane is distinct as a darker line beginning in close connection with this rib and extending backward along one side of the body in a wavy course to the posterior end, where it curves around the extremity of the parasite and comes to end near this end of the rib." The nucleus is ovoid, with a distinct membrane and a karyosomatic mass. "In addition to the undulating membrane the cyst usually shows two or three more delicate lines arising in close association with that organ and passing backward over the body for about two-thirds of its length. These are probably flagella. They stain poorly and are not constantly seen, especially in the more faintly stained specimens." Young cysts and forms of apparent pre-encystment were also seen. Multiplication was not observed in the cysts, which are for purposes of resistance and cross-infection.

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Various structures, such as *Blastocystis hominis*, which have been mistaken for Trichomonas cysts in the past, are briefly discussed and figured.

[The species name *hominis* belonging to the genus *Blastocystis* is wrongly ascribed by the author to WENYON, 1915 (not 1905). It should be ascribed to BRUMPT, 1912. See this *Bulletin*, vol. 1, p. 189.]

A. Porter.

BARLOW (Nathan). **Studies on Trichomonas.**—*New Orleans Med. & Surg. Jl.* 1916. Oct. Vol. 69. No. 4. pp. 299–307.

The author studied *Trichomonas intestinalis* in 100 unselected cases in St. Louis. Great stress is laid on the necessity of examining the stools quite fresh. Twenty-five of the patients harboured Trichomonas, of whom 22 had been previously reported as negative to intestinal parasites. Saline cathartics were used. Alternating diarrhoea and constipation were present in 14 of the cases, though some of the patients showed other pathological conditions. Fluidity of the stools was favourable to increase in numbers of the Trichomonads. Cultures of the flagellates on acidified bouillon, as recommended by LYNCH, were successful [see this *Bulletin*, vol. 6, p. 469]. Rabbits injected per rectum with trichomonad-containing material showed no diarrhoea.

Sulphur, salvarsan, emetine and ipecacuanha were without effect on Trichomonas. Methylene blue apparently reduced the number of the parasites as long as it remained in the body, but they afterwards increased again. Thymol in small doses of six grains three times daily was the most efficient drug tried, though the parasites might reappear again. As regards pathogenicity, the author states that "there may be different strains or even different species of Trichomonas and that some of these are at times more or less pathogenic."

The intestinal trichomonads were usually found to be from 10μ to 18μ in length, though forms of 22μ to 25μ were encountered, and one measured 32μ. The movement, as seen under dark-ground illumination, is thus described: "It seems to consist of two distinct movements, one of which is an undulatory motion, progressing very rapidly from the anterior to the posterior extremity. The other movement consists in the projection of pseudopodia which when projected, move from the anterior to the posterior extremity, gradually becoming less prominent as they approach the tail." Anteriorly, four flagella occur. There is a temporary cytostome existing as a transient cleft near the base of the flagella. The pseudopodia are stated to be composed of ectoplasm only. The author apparently considers that the undulating membrane is not a permanent structure, but is due to a rapid succession of pseudopodia "along the myoneme which passes from the origin of the flagella to the posterior extremity." The trichomonads are considered to be "normally fixed by the tail to an epithelial cell or to some solid body." The flagella and undulating membrane are considered to be primarily concerned in the creation of food-currents and only secondarily in locomotion.

Under adverse circumstances, one of three changes may occur. In the first instance, irregular pseudopodia appear and the organism is ultimately plasmolysed. In the second form of change, the tail may persist and move to and fro, but later the organism swells up and plasmolyses. In the third case, "the organism withdraws its appendages, becomes spherical in form, homogeneous in appearance, acquires a somewhat thickened outer membrane and is apparently a resistant form or dauer-cyst." The first phases of longitudinal division only could be followed under the microscope. The process of division is rapid. Iron haematoxylin was the only satisfactory stain. The nucleus contains a karyosome, and a rhizoplast passes to the anterior extremity of the body. There is only one basal granule from which the flagella arise. An axostyle was not seen.

Trichomonas vaginalis, as compared with *T. intestinalis*, is larger, its flagella are shorter as compared with the body, the undulating membrane is said to be "ordinarily invisible except anteriorly," the anterior end is not pointed but more rounded, its cultivation is more difficult and cyst production is more common. The author considers that the two species of Trichomonas are separate. Out of 100 cases from a gynecological clinic only five were found to be infected with *T. vaginalis*, and the parasite could apparently only thrive in "some pathological condition which produces a free discharge."

A. P.

PARANHOS (Ulysses). **Trichomonosis intestinal.**—*Brazil Medico.* 1917. Jan. 6. Vol. 31. No. 1. pp. 1–3.

The author gives a description of *Trichomonas intestinalis* as regards its morphology, occurrence in animals other than man and its transmissibility by injection and feeding experiments.

Contrary to the opinion of older observers that Trichomonas is devoid of pathogenic power in the human intestine, modern students are agreed that it is capable of producing pathological conditions. These may give rise to various forms of clinical picture, dysenteric, diarrhoeic and intestinal dyspeptic forms being described. The symptoms and signs of infection are dealt with at some length, also diagnosis, prognosis and the general inadequacy of treatments usually considered sufficient. In connection with the last section ESCOMEL's treatment is included [see this *Bulletin*, Vol. 5, p. 219].

B. Blacklock.

SANGIORGI (G.) & UGDULENA (G.). **Reperto di un flagellato** (*Prowazekia*, **n. sp.) nell' intestino umano.**—*Giorn. R. Accad. Med. di Torino.* 1916. Jan. to Feb. Vol. 79. No. 1–2. pp. 169–176.

In peptone water to which faeces had been added the authors found an organism which they consider for reasons stated (size, existence of ribbon-shaped forms, variations in position of the kinetonucleus, peculiar cultural properties) to be a new species of Prowazekia, for which they propose the name *P. italica.*

They were able to continue the cultivation of this organism for 70 days, subculturing every four days and keeping at a temperature of 22°–24° C. In each subculture, the parasites had a period of

incubation, during which time (3–4 days) they could not be seen. After this the development became rapid up to the eighth to tenth day when the culture exhausted itself, as shown by degeneration of individuals, decrease in number, loss of motility and encystment. By the 16th or 18th day on an average the cultures had died out. The shortest period during which the cultures remained alive was 10 days in the case of the fourth subculture, and the longest was 52 days in the case of the seventh. On agar profuse development occurred in the water of condensation from the third to the eighth day, after which decrease occurred and the cultures, without exception, had died out on the 10th day. Attempts to culture on the dry surface of agar and in tap water were not successful. A description of the morphology and measurements is given.

B. B.

YAKIMOFF (W. L.). *Prowazekia ninae kohl-yakimovi*, **n. sp. Note préliminaire.**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. p. 101.

While examining infusions of hay, the author found flagellates which had the characters in stained preparation of the genus *Prowazekia*. The parasite was found in two of three samples of hay from Petrograd, two of four from Novgorod, and two of seven from Gatschina, and one sample of straw. It was cultivated on Frosch's and Musgrave and Clegg's media. A brief description of the parasite is given.

B. B.

SWEZY (Olive). **The Kinetonucleus of Flagellates and the Binuclear Theory of Hartmann.**—*Univ. California Publicat. Zool.* 1916. Mar. 16. Vol. 16. No. 15. pp. 185–240. With 58 text figs.

This paper covers in a preliminary historical account the earlier theories concerning nuclear relations of the cell, beginning from the work of BUETSCHLI (1891) on the diatoms and ending with the creation by HARTMANN of the new order Binucleata in 1907. HARTMANN in 1911 modified somewhat his ideas on the general prevalence of the binuclear condition and limited it to those organisms which possess a second nucleus which arises by actual division of the "Hauptkern." The order Binucleata thus modified includes Herpetomonas, Crithidia, Trypanosoma, Trypanoplasma, Prowazekia, Leishmania, Halteridium, Haemogregarinida, Piroplasmida and Plasmodiida.

A critical discussion of the Binucleata and the binuclear theory follows under the headings Haemoflagellata (including Leishmania) and Haemosporidia. The author concludes that the constant presence in the Haemosporidia of a permanent cell organ comparable to the parabasal body of the trypanosome has not thus far been demonstrated, neither have undoubted flagellate stages in their life history been shown in a single authentic instance.

The parabasal body is treated at some length. With the exception of DOFLEIN the majority of protozoologists who have dealt with this subject have agreed in calling the parabasal body a second nucleus, that is the "kinetonucleus." LAVERAN and MESNIL and the French school regard it as a centrosome, a supposition for which little if any

adequate evidence can be found. SCHAUDINN (1904) used the term blepharoplast and was followed by the German investigators. He considered it nuclear in nature and not a centrosome. HARTMANN and PROWAZEK employed the same name but claimed for the structure both centrosomic and nuclear value. WOODCOCK first employed the term kinetonucleus, and MINCHIN agreed with this observer in attributing to it nuclear value, its function being that of a nucleus which controls the kinetic activity. The work of WERBITSKI (1910) [see *Sleeping Sickness Bulletin*, Vol. 2, p. 98], who produced strains of trypanosomes in which this structure was absent, upsets the idea that it is the main centre of kinetic activity because its loss was not followed by any diminution of this activity. ALEXEIEFF suggested that it might be a mass of reserve material, and on this account the term Parabasal body coined by JANICKI (1911) is more appropriate for this structure than any of the others which have been commonly applied to it. The author proposes the general adoption of this term.

An examination of the order Binucleata shows that it is founded upon an hypothesis, the binuclear theory, which in its essential point has been contradicted by the results of WERBITZKI, KUDICKE and others, in proving that the parabasal body is not composed of nuclear chromatin. Again the claim that the parabasal body arises *de novo* by a heteropole division of the nucleus, cannot be substantiated by a single instance critically proven either in the literature or in working over the organism themselves. Among the trypanosomes no worker since SCHAUDINN has been able to detect its *de novo* origin. There seems to be no good reason for retaining the Binucleata as an order of the Mastigophora, and for uniting the Haemoflagellata with the Haemosporidia.

B. B.

LEGER (M.) & MOUZELS (P.). **Plasmodium de** *Iguana nudicollis.*—*Bull. Soc. Path. Exot.* 1917. Vol. 10. No. 2. pp. 95–98.

Two specimens of *Iguana nudicollis* were found infected with a haematozoon of the genus *Plasmodium.* The invaded red cell is not deformed, nor as a rule enlarged; the nucleus retains its central position and its staining properties; the protoplasm is not polychromatophile, does not contain any inclusion, and shows no alteration comparable to Schüffner's or Maurer's dots.

The authors proceed to give descriptions of the asexual and sexual forms. Young and adolescent forms are never pigmented, but adult forms occasionally contain pigment. In the peripheral blood no segmenting parasites were discovered, but these occurred in organ smears especially of the lungs, and resulted in the production of four merozoites. Microgametes and macrogametes are described as occurring with extreme rarity in the peripheral blood, but commonly in the organ smears. Parthenogenetic forms appear to exist and in the peripheral blood pigmented mononuclear leucocytes were frequently seen.

The authors consider this a new species. They give the distinguishing features which separate it off in their opinion from various other Plasmodia previously described and call it *Plasmodium carinii.*

B. B.

LEGER (Marcel). **Observations sur quelques Leucocytozoon d'Oiseaux de la région de Reims.**—*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 28–33.

Of 15 crows, *Corvus corax*, from the Champagne district 12 were infected—as a rule heavily—with haematozoa. Infection begins early in life, as three out of four had Leucocytozoa before they were able to fly. Of another five aged about 12–15 days all were heavily infected. The author describes the morphology of the parasite and differentiates it from *L. sakharoffi* of *Corvus corax* in Transcaucasia. By receiving blood in slightly acidulated water and staining he has proved to his satisfaction that the parasitized element of the blood is a mononuclear leucocyte and not an erythrocyte. He observed the process of exflagellation in oxalated saline, but never in pure blood. A description follows of the appearance of the flagellated bodies in fresh and stained preparations. Forms of the parasite which seemed to belong to some phase of multiplication were found in the bone marrow.

Leucocytozoon berestneffi Sambon, 1908, was found in magpies, *Pica melanoleuca*, 8 out of 11 from the same region. In the great owl (*Asio accipitrinus*) a parasite was found which the author identifies as *L. ziemanni* Laveran, 1902. This parasite presented various young stages, by the study of which the author is enabled to state that it inhabits erythroblasts.

B. B.

YAKIMOFF (W. L.) & SCHOKHOR (N. J.). *Leucocytogregarina musculi* **A. Porter à Petrograde.**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 100–101.

The leucocytogregarine which PORTER discovered in the blood of white mice in London in 1908, and SANGIORGI subsequently found in Turin, was observed by the authors in organ smears of a mouse in Petrograd. The parasites were always in large mononuclear leucocytes, never free.

B. B.

MARKOFF (Wladimir N.). **Piroplasmose und andere blutparasitäre Krankheiten der Haustiere am Balkan.** [Piroplasmosis and Other Diseases of Domestic Animals in the Balkans due to Blood Parasites.]—*Archiv. f. Schiffs- u. Trop.-Hyg.* 1916. July. Vol. 20. No. 14. pp. 313–335. With 5 charts.

The author gives a list of localities in the Balkan Peninsula in which he has found piroplasmosis of horses to be endemic. The list includes various places in Turkey, Greece, and Bulgaria. He proceeds to give the history of equine piroplasmosis in Europe from the time of GUGLIEMI (1899), and the known localities outside Europe in which it occurs, and then deals with the ticks concerned in its transmission. Next he gives his own observations on the parasite concerned (*P. bigeminum*) and dwells on the fact that extracorpuscular forms are by no means rare. In two cases he found extracorpuscular bodies resembling piroplasma, lying free in the plasma. They were of rather larger size, had no obvious chromatin, and stained dark blue at the periphery. He suggests that these may be parasites in which

the chromatin was badly stained or from which the chromatin had escaped. Professor MUEHLENS informed him that he had observed similar chromatin-lacking and extracorpuscular forms of the malaria parasite in Asia Minor and that he believed that they occurred when the host was becoming immune. The author mentions swellings in various parts of the body as of common occurrence in his cases, swellings 50–70 mm. by 30–40 mm. by 5–10 mm., affecting most commonly, in order, the area from the thorax to the genitals, the neck, the sides of the chest and the head. The swellings were not of an inflammatory character and no parasites were found on puncture of them. Their duration was long, frequently 1–2 months. No abscess formation was observed. A note on treatment follows. In acute cases trypanblue is recommended, while chronic cases are best treated, in the author's opinion, by two or three injections of 10 cc. of a 1 per cent. sublimate solution, at several days' interval.

Cattle piroplasmosis, and piroplasmosis in sheep are next considered in short sections and then dourine. This disease was first notified in Nish in 1902 by TATSCHEFF. He considered that it had been imported by the agency of an infected stallion from France. It spread locally, then into North-East Bulgaria, especially the Dobrudja and into Southern Bulgaria. Finally, the disease was eradicated, except for sporadic cases on the Rumanian frontier. The author saw three cases, in a stallion and two mares, of which he gives an account. Trypanosomes were found only on two occasions in vaginal and urethral secretions. The results of inoculation of blood and secretions were negative. The serological methods proved not to be very reliable for diagnostic purposes. A short note on spirochaetosis in fowls concludes the paper.

B. B.

SPARAPANI (Giuseppe Carlo). **Trasmissione dell' infezione da *Piroplasma ovis* in tre suini per via digerente.** [Transmission of *P. ovis* to Three Pigs by the Alimentary Canal.]—*Pathologica.* 1917. Jan. 15. Vol. 9. No. 196. pp. 21–22.

Three pigs which appeared ill at the time of slaughter, 15th Dec., 1915, presented at autopsy numerous signs of disease. The tissues were stained yellow, especially the subcutaneous and perirenal; the liver was enlarged, also the spleen; the urinary bladder contained very dark red urine; small haemorrhages were common in various regions and organs, the mesentery and mesenteric glands, the mucous membrane of the stomach, intestine and bladder being affected. The author examined blood and organ smears and found numerous piriform parasites, which he considers from a study of their morphology and measurements to be *P. ovis.*

He ascertained that all three pigs came from the same farm and that they had all eaten the flesh of sheep which were dying there in October and November of that year. He proceeded to this farm and selected from the sheep several which looked sickly and examined their blood. He found nine heavily infected with *P. ovis,* and concludes that the pigs became infected by the digestive tract through eating the flesh of animals which had been dead, in some cases, 15 to 18 hours.

B. B.

FINZI (Guido) & CAMPUS (Antonio). **Anaplasmosi sul significato del "corpi endoglobulari," "punti marginali," "anaplasmi," trovati nel sangue degli ovini della Sardegna e del Piemonte.** [Anaplasmosis and the Significance of "Endoglobular Bodies," "Marginal Points," "Anaplasmata" found in the Blood of Sheep in Sardinia and Piedmont.]—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 143–150.

Anaplasmosis in dogs, pigs, horses and sheep has been recorded by TIBALDI in Sardinia. The authors wishing to study this condition had seven sheep sent from Sardinia; these sheep had been born and bred there. They were placed under observation and after some months one of them became ill and died after 10–12 days in a state of exhaustion. The preceding symptoms were loss of flesh, lassitude, loss of appetite, intense thirst, oedema and pallor of the conjunctivae and other mucous membranes, rapid pulse, dyspnoea. The faeces contained large numbers of Distoma ova. The authors attributed death to Distoma infection and the autopsy confirmed their opinion. Blood films taken during the illness showed that the red cells contained centrally or marginally situated coccoid bodies which took on strong chromatin staining. These were in no way to be distinguished from marginal dots or anaplasmata. Examination of the remaining sheep revealed the fact that two of them had a similar condition of the blood cells, in one the percentage of affected cells being 30. Ova of distomes were found in their faeces.

Experiments were then undertaken on sheep and rabbits in Piedmont in order to ascertain what effect the artificial production of anaemia would have on their red cells. Distilled water and haemolytic sera were used and the authors observed that they could produce with the greatest certainty the blood picture observed in the Sardinian sheep. They conclude that marginal and central dots are in many cases simply alterations in red cells consequent on anaemia, and that the occurrence of anaplasmosis among Sardinian sheep cannot be corroborated. While not denying the existence of anaplasmosis as a disease produced possibly by a protozoal organism, they consider that the terms relating to it have been used with too great freedom and too little evidence.

B. B.

CARINI (A.) & MIGLIANO (L.). **Sobre um toxoplasma da cobaya** (*Toxoplasma caviae*).—*Ann. Paulist. Med. e Cirurg.* 1916. May. Vol. 6. Year 4. No. 5. pp. 113–114.

A guineapig about four weeks old was found dead without having shown any symptoms of disease sufficient to attract attention. On autopsy the spleen was found to be three or four times the normal size and friable, the liver was enlarged and hyperaemic, the lungs presented areas of congestion, and the intestine was red in colour with engorged blood vessels. Smears from the organs stained with Leishman's and Giemsa's stains contained a few bodies which had the characters of Toxoplasma. The nucleus stained reddish violet, the protoplasm pale blue; the shape was usually curved, oval or piriform, rarely rounded or irregular. A few intra-cellular parasites

were found, but the majority were free. In the liver preparations multiplication forms were seen, masses of protoplasm with several nuclei.

Inoculation of emulsion of the organs under the skin of two pigeons caused their death in 17 days. For the first 14 days no ill effect was observed, but during the last three, thirst, loss of appetite, diarrhoea, extreme depression and ruffling of the feathers occurred. Parasites were found in large numbers in the liver and in the lungs.

It is known that guineapigs may be infected experimentally with Toxoplasma, and the authors recite this case in order to show that spontaneous infection with this parasite may also occur in them. The authors had already observed infection in two guineapigs, but had not been absolutely certain, as they are in this case, that the infection was spontaneous, on account of the fact that the animals had been inoculated with pathological materials of various kinds.

The authors think it probable that this Toxoplasma is the same as that of the rabbit, dog, etc., but until this is determined they propose the name *T. caviae* for it.

B. B.

KORKE (Vishnu T.). **On a Nosema** (*Nosema pulicis*, **n. s.**) **Parasitic in the Dog Flea** (*Ctenocephalus felis*).—*Indian Jl. Med. Res.* 1916. Apr. Vol. 3. No. 4. pp. 725–730. With 1 plate.

The author in the course of dissecting dog fleas with a view to discovering natural flagellates, observed frequent infections of their digestive tract with a Nosema, to which he gives the name *N. pulicis.* After a short reference to the history of recorded species of Nosema he gives an account of his material and technique. Of dog fleas collected from a half-breed spaniel, about one in every six was found to be infected. The fleas were placed in breeding cages in the laboratory and were fed daily on wild black rats. The larvae obtained from the breeding cages were those of two species, *C. felis* and *Xenopsylla cheopis*, the latter having no doubt been derived from the rats used for feeding purposes. In about three weeks' time infection developed to such an extent among the larvae that practically every other larva was infected with Nosema. The midgut was early infected, and at a later stage the whole digestive tract from the oesophagus to the rectum. Heavily infected larvae are dark and mottled in appearance and at once distinguishable from healthy larvae. Pathogenicity could not be completely worked out as cold weather interrupted the experiments.

A description of the morphological cycle is given and is illustrated by a plate, the basis for comparison being STEMPELL's description of *N. bombycis.*

[The author does not make it clear whether the larvae of *X. cheopis* also became infected. FANTHAM and PORTER [see this *Bulletin*, Vol. 3, p. 128] found that excrement of bees infected with *Nosema apis* was capable of infecting bees, wasps, *Calliphora erythrocephala*, *Melophagus ovinus*, the larvae and imagines of cabbage white butterflies, cinnabar moths, and gooseberry moths.]

B. B.

SANGIORGI (G.) & UGDULENA (G.). **Ciliati nell' intestino umano.**—*Pathologica.* 1917. Jan. 1. Vol. 9. No. 195. pp. 1–4.

The authors refer to a previous paper [see this *Bulletin*, Vol. 8, p. 16] in which they described their methods of cultivation of a flagellate of the faeces, *Prowazekia italica* n. sp.

The present paper describes two ciliates found by them in human faeces, the first being "*Balantidium minutum*, sp. *italicum*," the second *Nyctotherus faba*. They describe the morphology, and give measurements, and state their reasons for considering that the Balantidium with which they are dealing differs somewhat from *Balantidium minutum* Jacoby and Schaudinn, 1899. Two characteristics appear to the authors of differential value: (1) the eccentric position of the nucleus, (2) the peculiar orientation of the micronucleus.

The primary culture of the Balantidium was obtained by sowing a loopful of fresh faeces in peptone water and allowing to remain at room temperature. The culture after an incubation period of three days contained a great number of very active vegetative forms, and the ciliate could then be studied with greater accuracy than when contained in the faeces. For 10 days the parent culture remained rich in vegetative forms, which soon became less numerous and less active and then encysted. Finally no vegetative forms could be discovered, only cysts. After some days of quiescence however, a new generation of vegetative forms appeared, as active as the first; in 3–4 days encystment occurred.

Subcultures were made, the first on the seventh day. A similar course was observed, rapid increase reaching the acme on the 7–8 day, followed by rapid decline and encystment. Twelve successive subcultures at a week's interval have been carried out up to the time of writing. In all of them the increase and decline of the protozoa show the same curve as in the parent culture, and in all cases the same remarkable recrudescence occurred after a quiescent period.

In order to determine what element of the protozoal cycle was responsible for such recrudescences, the authors produced encystment of the ciliates by placing them on the surface of ordinary agar. When microscopic examination of this showed that encysted forms only were present, a loopful was transferred to peptone water. In this active vegetative forms quickly developed and then encysted finally. From this experiment the authors conclude that cultural recrudescence is due not to any particularly resistant vegetative forms carried over, but to reproduction cysts. The clinical observations made by JACOBY and SCHAUDINN on their cases have a bearing on this point. These observers found that when the faeces of their patients became of solid consistency, the ciliates disappeared and only a few cysts were found. A purgative caused the reappearance of the ciliates in the liquid stool, this being due to the fact that they remained active in the upper portions of the intestine which had fluid contents.

Cultivation on common agar was obtained, the vegetative forms developing rapidly in the water of condensation, whereas encystment occurred on the drying surface of the agar. Certain modifications in morphology were observed in agar-grown vegetative forms, as compared with peptone-water forms. With the second ciliate the

authors succeeded in maintaining the parasite through four generations by subculture. The same rhythmic features were observed. [For ciliates "Balantidium or Nyctotherus" occurring in sand, see this *Bulletin*, Vol. 8, p. 437.]

B. B.

BAYON (H.). **The Development of Pathogenic Properties in Protozoa, with Special Reference to the Herpetomonad Group.**—*Trans. Soc. Trop. Med, & Hyg.* 1916. Dec. Vol. 10. No. 2. pp. 23–32.

Protozoa of medical interest are tabulated by the author in the following fashion :—

Free living or Sapropelic. Ex., Infusoria.

Epizoic ; all pathogenic, some even lethal. Ex., Icthiophthirius, Leishmania.

Entozoic
- Saprozoic, usually enterozoic. Harmless, possibly even beneficial. Ex., Chlamydophrys.
- Pathogenic
  - Lethal. Ex., *Trypanosoma rhodesiense.*
  - Non-lethal. Ex., *Leishmania tropica.*

The Treponemata, Herpetomonads, Trypanosomes, Amoebae, Plasmodiidae and Babesia are reviewed generally in regard to their properties of producing disease in man and animals, with the idea of showing that complete adaptation to a parasitic mode of life is accompanied by alterations in morphology and enhancement of virulence.

The herpetomonad group is dealt with at some length, as it forms an exception to the author's generalizations in certain respects. FANTHAM and PORTER's work is quoted. [No mention is made of the work of LAVERAN and FRANCHINI who first successfully infected mammals with insect herpetomonads. This *Bulletin*, Vol. 2, p. 463.]

B. B.

YAKIMOFF (W. L.) & SAPHRONOWITSCH (R. A.). **Parasites du sang des animaux en Transcaucasie.**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 98–100.

i. (*Grahamella* chez les rongeurs du Caucase, par W. L. YAKIMOFF).

Grahamella ninae kohl-yakimovi is the name given to Grahamella found in a hamster (*Cricetus phoca*). Grahamella was also found in a field mouse, in which anaplasmata were observed. Neither animal appeared ill ; there was some polychromatophilia.

ii. (*Theileria* chez le Campagnol, par W. L. YAKIMOFF & R. A. SAPHRONOWITSCH).

In the blood of several field mice in the district of Kars parasites were found which the authors believe to be Theileria. Such parasites had previously been found in field mice in Saratow. No piriform or bacillary forms were seen. The name *Theileria rossica* is given to the parasite.

iii. (Leucocytogregarina d'un poisson, par W. L. Yakimoff).

The authors give a short account of the morphology and the measurements of a body discovered in a large mononuclear leucocyte of a fish. They call it *Leucocytogregarina ninae kohl-yakimovi.*

B. B.

Goodrich (Helen Pixell) & Moseley (M.). **On Certain Parasites of the Mouth in Cases of Pyorrhoea. (Preliminary Communication.)** —*Jl. Roy. Microscop. Soc.* 1916. pp. 513–527. With 6 plates.

The structure of *Entamoeba gingivalis* (Gros.) is described, as is also the nature of the inclusions apart from bacteria. These inclusions the authors consider to be the nuclei of lymphocytes or other mononuclear leucocytes. Living amoebae in saliva or Ringer's solution—in which they live eight or nine hours—could not be observed to ingest large bodies, whereas small organisms could be seen to pass into their interior each in a tiny vacuole.

The view of Bass and Johns [see this *Bulletin*, Vol. 6, p. 55] that these amoebae have any part in the production of pyorrhoea is based on erroneous assumptions which the authors proceed to analyse and criticize.

Pyorrhoea lesions differ from other suppurating sores in that no organisms appear to invade the tissues. No organism can be as yet definitely incriminated as the primary cause of the gingivitis with which the authors feel sure the disease begins, but they feel inclined to the belief that the Leptothrix which they found constantly present and of which they give a full description is the real cause of the disease. They enter into the history of what is known of this pleomorphic leptothrix and express the belief that various described forms, fusiform, coccoid and filamentous, are all component parts of the same organism, but that this can only be established satisfactorily by culture of complete colonies, which they intend to attempt. Several microphotographs of practical value are included in this preliminary communication.

B. B.

Macfie (J. W. Scott). **A Further note on a Disease of Fowls characterised by Inclusions in the Leucocytes.**—*Report of the Accra Laboratory for 1915.* pp. 68–70. With 1 chart. [1916.] London: J. & A. Churchill.

A disease of fowls occurring at Eket, in Nigeria, was the subject of a previous paper by the author [see this *Bulletin*, Vol. 5, p. 293]. The disease was exceedingly acute, death resulting usually within two days, and was inoculable. In each case leucocytes were found enclosing chromatic granules and rings of a type that did not occur in healthy fowls. No spirochaetes were seen.

The present paper deals with similar leucocyte inclusions found in the blood of a sick turkey at Accra which was also infected with Halteridium. Intramuscular injection of atoxyl failed to prevent death. A cock which was inoculated subcutaneously with heart blood became ill on the 5th–6th day, and died on the tenth day. A second

cock inoculated from the first became ill on the fourth day but recovered. Two chickens inoculated from the second cock on the sixth day did not become ill. The leucocyte inclusions present in the turkey appeared—on the fourth and sixth days respectively—in each of the cocks which became ill; the Halteridium did not appear.

The author could find no other cause for the disease, and considers that his observations support the view that the leucocyte inclusions, which are possibly Chlamydozoa, were responsible.

B. B.

MACFIE (J. W. Scott). **Bodies resembling *Paraplasma flavigenum* in Men and Animals.**—*Report of the Accra Laboratory for 1915.* pp. 58–63. With 1 chart and 2 plates. [1916.] London: J. & A. Churchill.

The author puts on record two cases which although not considered to be suffering from active yellow fever, yet had in their blood bodies apparently identical with *Paraplasma flavigenum.* One was a European in the fifth month of his seventh tour in W. Africa; on admission to hospital his liver and spleen were enlarged, and a few malaria parasites (*P. falciparum*) were present in his blood. His temperature rose in spite of quinine to 100° or 101° F. at irregular intervals. The author examined blood films taken from the patient over a month after his admission to hospital. No malaria parasites were found, but relatively large numbers of bodies resembling *P. flavigenum.* The second case was a native in whom, in the course of an attack of fever of a relapsing type, similar bodies were found in greater numbers than the author has seen them in any confirmed case of yellow fever.

The author discusses the views held by various observers on these bodies and their relation to yellow fever. He considers that CONNAL and JOHNSTON's observation on the appearance of such bodies in guineapigs which have not been inoculated with yellow-fever blood [see this *Bulletin*, Vol. 7, p. 294], must shake confidence in the evidence adduced from guineapig inoculation in favour of the view that yellow fever can be transmitted to these animals. He submits that the last word on *P. flavigenum* has not been spoken, and that further investigation of these very definite bodies is necessary to decide both their nature and their relationship to yellow fever.

B. B.

DYSENTERY.

Amoebiasis.

Medical Research Committee. National Health Insurance. **Reports upon Investigations in the United Kingdom of Dysentery Cases received from the Eastern Mediterranean. 1. Amoebic Dysentery and the Protozoological Investigation of Cases and Carriers.** [Clifford Dobell.]—*Special Report Series No. 4.* 85 pp. 1917. London: H.M. Stationery Office. [Price 1*s.* net.]

An introduction to this Report contains references to the general question of the medical records of cases of amoebic dysentery returned to this country. It is pointed out that under "ideal conditions" it should be possible to trace the clinical and pathological history of each case from the onset of the attack of intestinal disorder until final discharge from hospital or convalescent depôt. Some doubt is expressed as to whether the records of the epidemic will, even when they become available, prove to be ideally complete. The conditions of stress and urgency under which most of them were necessarily made render it improbable.

Even in this country, when the influx began of men invalided from the endemic area there was no existent organisation staffed and equipped for the diagnosis of protozoal infections. The number of persons available in this country who were competent to make the requisite examinations and to produce records of scientific value, was very small in relation to the sudden call for this particular kind of knowledge and skill.

In order to supply the deficiency the Committee took steps to enlist as workers persons with knowledge of microscopical technique from extra-medical departments of biology. These workers after training were to be used in a limited number of centres in which the War Office agreed to concentrate patients suffering from or convalescent after dysentery. If this arrangement could have been carried out, the results of a complete investigation in accordance with a common plan would have been obtained. Unfortunately, this scheme of concentration proved impracticable, so that incompleteness and inequality of records have to some extent persisted throughout the investigation. However, such protozoal records as could be obtained from the various centres where numbers of cases had been examined, have been collected. The records are dealt with analytically and presented by Dobell in the Report. Some of the records have already been discussed in this *Bulletin.*

As it is quite impossible to summarize in a few paragraphs the mass of information collected and analysed, those who are interested in the subject of protozoal infection of the human intestine, with especial reference to dysentery, should consult this Report.

Some of the conclusions with regard to treatment are given, as they may be of service to those who have not access to the original.

E. histolytica.—Emetine bismuth iodide, properly administered, has successfully cured the majority of carriers of *E. histolytica* who have hitherto been treated.

For treatment to be successful, the drug must be given in large doses—not less than 36 to 40 grains in daily doses of three to four grains. Less than this amount is seldom efficacious and more may be necessary in individual cases.

Emetine administered in this form has generally been successful even when previous treatment with emetine hydrochloride injections has proved a failure.

Entamoeba coli.—Emetine bismuth iodide may exceptionally prove successful in removing an infection with *E. coli.* As a rule it is not efficacious. No other drug has yet been shown to have any action upon this organism.

Lamblia, Trichomonas, Chilomastix.—There is no evidence, from the cases in the present series, to show that a successful method of removing flagellate infections has yet been found.*

B. Blacklock.

WENYON (C. M.) & O'CONNOR (F. W.). **An Inquiry into some Problems affecting the Spread and Incidence of Intestinal Protozoal Infections of British Troops and Natives in Egypt, with Special Reference to the Carrier Question, Diagnosis, and Treatment of Amoebic Dysentery, and an Account of three New Human Intestinal Protozoa. (Conducted under the Auspices of The Medical Advisory Committee, M.E.F., January to August, 1916).**—*Jl. Roy. Army Med. Corps.* 1917. Jan., Feb., Mar. Vol. 28. Nos. 1, 2, 3. pp. 1–34, 151–187, 346–370. With 4 plates and 3 text-figs.

This paper deals with many aspects of the problems which confront investigators who have to undertake the diagnosis of human intestinal affections caused by, or complicated by the presence of, various protozoa. The majority of the investigations were carried out in Egypt.

PART I.—The methods of collecting material which were found most satisfactory are first described. Then tables are given in which are shown the results of frequent examinations of 92 cases; these bring out clearly the well recognised fact that a single examination of the stool is not sufficient in many cases to exclude the possibility of infection with a particular protozoon being present. The protozoological findings in various groups of men are next detailed under the heads (a) Healthy Troops, (b) Convalescents, (c) Hospital Cases, (d) British Prisoners in the Military Prison, Gabarri, (e) Healthy Natives, (f) Native Cooks, (g) British West Indian Troops, with tables showing percentage infected with protozoa of various kinds, percentage infected with *E. histolytica*, and in addition some tables showing percentage of helminth infestation.

In order to give the reader a clear idea of the percentage incidence of intestinal protozoa as found by the authors in Egypt a table is here reproduced on the following page which they have compiled from their examinations of the various groups previously mentioned and in addition a group of convalescents examined in London.

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*All to whom it falls to present papers on the drug treatment of amoebiasis or other protozoal disease, especially the carrier condition, should study this Report, and in particular the chapter headed "Inquiry into the Value of Negative Examinations," wherein the subject receives a searching analysis.—ED.

TABLE IX (Composite Table).

Protozoa found amongst Convalescent and Healthy Troops in Alexandria and London, and Natives in Alexandria. (Percentage of Infections.)

	Healthy troops.	Convalescents Alexandria.	Convalescents London.	Hospital cases.	Gabarri Prison.	Hadra Prison Natives.	Native cooks.	British West Indian cooks.
Total examined	1,979	328	556	961	168	524	87	48
E. histolytica	5·3	6·4	10·8	3·2	1·8	13·7	11·5	4·1
E. coli	20·0	31·7	39·0	10·4	12·0	48·6	20·7	18·7
Lamblia	4·8	5·4	16·0	6·0	6·0	0·57	7·0	4·1
Trichomonas	1·1	0·67	1·6	3·0	2·4	0	1·1	0
Tetramitus	1·1	0·9	0·7	2·8	3·2	0·19	1·1	0
Coccidium (*Isospora*)	0	0	2·7	0	0	0	0	0
Coccidium (*Eimeria*)	0	0	0·2	0	0	0	0	0
Entamoebae (undiagnosed)	1·3	1·8	0	2·0	17·2	0·57	1·1	0
Iodine cysts	3·0	2·0	5·2	0·3	0	14·8	7·0	4·1
E. nana	0	0	1·0	3·0	12·0	0	0	0

Having made some analytical observations on the Protozoal Infections which this table contains, the authors pass on to discuss the possibility of isolating carriers of *E. histolytica* among healthy troops and conclude that in Egypt very little can be done in this direction and that it is inadvisable to attempt it on a large scale in time of war. As to whether there is any danger of amoebic dysentery spreading in England they adduce the lesson of previous experience, the smaller number of flies, the higher state of sanitation, and the better regulated habits of the people, as factors which render this danger slight.

Convalescents should be dealt with clinically. Men who appear fit should be returned to duty and only in those cases where a man is obviously not fit should examination for *E. histolytica* be made.

Many practical considerations are discussed, such as the length of control necessary after treatment of *E. histolytica* carriers, and the necessity or not of invaliding for Flagellate Infections. A section is devoted to the question whether amoebic dysentery formed such a high percentage of the total dysenteries which occurred in the Gallipoli campaign as has sometimes been stated. On this matter the authors are inclined to the view that the amount of amoebic dysentery has been over-estimated. "The presence of the cysts of *E. histolytica* in the stool, though it proves the infection with this amoeba, does not necessarily mean that the case is or has been one of actual amoebic dysentery." Again, speaking of the results obtained by LEDINGHAM, PENFOLD and WOODCOCK in London,* the authors say: "In one series representing cases which had left the Peninsula, in June, July, and August, dysenteric stools occurred in 15 cases and dysentery bacilli (chiefly Shiga) were recovered from all of these, while *E. histolytica* occurred in none. This result is difficult to explain if it is assumed that amoebic dysentery was more prevalent than bacillary during the first months of the campaign. In a later series of cases these observers found by the agglutination test that 47·5 per cent. gave evidence of past bacillary dysentery while none were amoebic." [It is true that the presence of *E. histolytica* cysts in the stool does not mean that the case is or has been one of actual amoebic dysentery, but it may also be argued that the presence of dysentery bacilli does not necessarily mean that the case is or has been one of actual bacillary dysentery. Further it will be seen that of the two series of cases mentioned by the authors above, in the first (15 cases) dysentery bacilli were found in all, *E. histolytica* in none, while in the second 47·5 per cent. gave evidence of past bacillary dysentery while none were amoebic. In view of the fact that infection with *E. histolytica* is not uncommon in soldiers from the Eastern Mediterranean (this paper, Healthy Troops 5·3 per cent.; Convalescents, Alexandria, 6·4 per cent.; Convalescents, London, 10·8 per cent.), the total absence of *E. histolytica* in the latter of the two series quoted certainly appears worthy of remark.]

PART II.—The authors fixed a standard for their observations on *E. histolytica*," a standard which one of us has upheld and taught for a considerable time in connection with this work and one which the ordinary observer, who knows how to recognise amoebae and cysts, can readily follow. We have called no infection one of *E. histolytica*

* This *Bulletin*, Vol. 7, p. 228.

unless we have found at least some amoebae with included red corpuscles present, or unless we could find definite cysts of *E. histolytica* associated with the amoebae in the stool."

In two experiments which were made by mixing finger blood with *Amoeba coli* in faeces, and incubating, no ingestion of red blood corpuscles was seen.

Cysts of *E. histolytica* of small size are described, 7μ to 10μ, and various strains up to a size of 14μ to 18μ. [In a previous paper Wenyon* gave the size of *E. histolytica* cysts as 10μ to 14μ. It is not made clear whether the diagnosis of the cases in this paper was made on the previous standard, i.e., 10μ to 14μ or on the one now stated, i.e., 7μ to 18μ.]

The history of carriers of *E. histolytica*, how long they remain infected and how many pass on to an acute dysenteric condition, is next discussed. The well known experiments of WALKER and SELLARDS [this *Bulletin*, Vol. 3, p. 63] are referred to in considering the mode of infection. The diagnosis of *E. coli*, its characters in the unencysted stage and its cysts, precede descriptions of the course of infections with *E. coli*, and a discussion on its possible pathogenicity. The authors find no justification for considering this amoeba pathogenic.

Lamblia intestinalis.—An opportunity offered itself of studying the process of longitudinal division of this parasite, and a description of this process is given. The authors refer to KOFOID and CHRISTIANSEN'S description of the mode of division in the Lamblia of mice. *Tetramitus mesnili*, *Trichomonas intestinalis*, and mouth trichomonas are studied with regard to morphology, course of infection and pathogenicity. A single case of infection with Isospora was found during the first six months of 1916 in the examination of a larger number of men, as compared with 15 infections in 556 cases examined in London in the latter half of 1915.

Under the name *Waskia intestinalis* a new human flagellate is described. It is an ovoid parasite, rounded anteriorly and pointed posteriorly, possessing a cytostome and two flagella. It measures from 4μ to 9μ, but wider forms and even spherical ones are described. The cysts of this organism are pear-shaped bodies 4·5 to 6μ long. [MACKINNON in 1911 created the genus *Embadomonas* for a flagellate which she described from the intestine of trichopterous larvae. The generic diagnosis given by her appears to resemble closely that of the present organism.]

Tricercomonas intestinalis, n.g., n. sp. This parasite was found in about a dozen cases. It has a spherical or ovoid body flattened on one side, three long anterior flagella and one posterior which passes over the flattened side of the body. No cytostome could be distinguished. Length, 4μ to 8μ. The flagella are longer than the body. Probable cysts are described 6–8μ in length and half this in breadth.

Entamoeba nana, n. sp. A description is given of the vegetative form, 5–10μ, and the cysts (oval 8–10μ long, spherical 7–8μ in diameter) of an amoeba commonly occurring in the human intestine in Egypt. It is regarded as a new species of human parasite.

B. B.

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* This *Bulletin*, Vol. 7, p. 231.

SANDFORD (A. H.). **The Geographic Distribution of Amebiasis.**—*Jl. Amer. Med. Assoc.* 1916. Dec. 23. Vol. 67. No. 26. pp. 1923–1926. With a map.

The danger of regarding amoebiasis as exclusively a disease of the tropics is the main theme of the author of this paper. Reference is made to cases recorded in Europe and to cases in the Northern States.

The body of the paper consists of the setting forth of the findings of the author and his colleagues.

"For several years at the Mayo Clinic the stools of patients with chronic diarrhea have been systematically examined. Sistrunk, Giffin and I have all made reports of these findings. During the past five years there have been approximately 6,500 stool examinations. Repeated examinations, and examinations for occult blood, etc., reduce the number of patients examined for parasites to about 5,000."

The Northern States were represented by 819 positive cases in which some type of amoeba was found, 284 diagnosed as *Endamoeba coli*, and 535 as *Endamoeba histolytica*. Of 95 "control" patients from the South and Orient in whom amoebae were found, 65 had *E. histolytica*, and 30 *E. coli*, so that of the 5,000 cases, 18 per cent. had "amebas of some sort." [It is not stated how many of the total 5,000 came from the North and how many from the South.]

The author and his colleagues followed the descriptions of CRAIG and JAMES in making their diagnosis and it is remarked, "we have recognised fully the difficulties in attempting to classify types of amebas, and feel that in some instances errors in diagnosis readily occur." The fact is noted that many protozoologists claim that an absolute diagnosis can be made only by studying cysts. The symptoms presented by those cases infected with amoebae who came from temperate climates were: constant diarrhoea 41 per cent., intermittent diarrhoea 33 per cent., no bowel trouble except constipation 26 per cent. [From the quotation given early in the review it appears as if all the 5,000 cases had a history of diarrhoea.]

Intracaecal injections in kittens resulted in infection "in a small series."

The author concludes that stool examinations are worth while for any patient with vague abdominal complaints or chronic diarrhoea, no matter whence he comes.

B. B.

FLU (P. C.). **Vliegen en amoebendysenterie.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. No. 6. pp. 928–939.

Musca domestica and *Calliphora erythrocephala*, in the tropics, have great importance for the sanitarian on account of their habits. The females lay their eggs for preference in human faeces which is not too old. As regards the feeding habits of these and kindred flies, the author found in experiment that they fed with about equal avidity upon fresh human faeces, bread, or syrup.

A consideration of the anatomy of the mouth parts leads the author to the conclusion that the chance of such flies as *Musca domestica* and *Calliphora erythrocephala* being able to take up *tetragena* cysts is small when these cysts are presented to the flies in a fluid medium, for example, diarrhoeic faeces in a thin layer. Possibly alterations

in shape owing to the thinness of the cyst wall may facilitate the process. Quite a different result is found when the food of the flies is composed of solid or semi-solid material. NICOLL's successful experiments with the eggs of helminths are mentioned.

The author's experiments proved that some flies at any rate are capable of taking up cysts. GRAHAM SMITH's method utilizing a lamp glass was adopted. Material rich in cysts was used. Of 35 flies in the first experiment, 9 refused to feed. After two hours 18 flies were examined; one was found with numerous cysts in the proboscis and intestine; three others had cysts in the stomach. After four hours the 10 (*sic*) flies which still survived were examined and three had cysts in the intestine. The diagnosis of the cysts was confirmed by staining.

In the second experiment a somewhat similar result was obtained and the faeces of the flies showed numerous cysts.

The third experiment was carried out with *tetragena* cysts and Blastocystis. Of 25 flies used, only 12 fed. In the intestinal contents of all these Blastocystis was found in large numbers, while in four *tetragena* cysts were also found. Thus not all flies but about 25–33 per cent. can become infected with *tetragena* cysts. This was what NICOLL found as regards helminth ova, and the explanation must be sought, following GRAHAM SMITH, in the circumstance that only those flies become infected which suck so violently as to force open the prestomal fissure. WERNER failed to find a development into cysts of vegetative forms of *E. histolytica* after ingestion by flies, while in the case of *A. limax* this was found to occur. In other experiments cysts of the latter species underwent no conversion into vegetative forms in the fly gut, but were passed in the faeces unchanged, and alive, as proved by successful culture.

The work of J. G. & D. THOMSON [see this *Bulletin*, Vol. 8, p. 437] is quoted and the statement, made by them as a result of their experiments in fly transmission of amoebic dysentery, "In fact it seems highly probable that this is by far the most common and important mode of transmission," is criticised as too sweeping. Epidemiological experience clearly teaches, says the author, that drinking water which has become infected has the greatest importance.

B. B.

MAUTÉ (A.). **Contribution à l'étude de la dysenterie amibienne (à propos d'observations recueillies au Maroc.)**—*Presse Méd.* 1916. Oct. 26. Vol. 24. No. 60. pp. 483–484.

The failure to detect cysts in the faeces of patients who have suffered from amoebic dysentery and who have apparently been cured, should not be considered proof of cure, even when several negative examinations have been made on successive days. An attempt to cause their reappearance in the stools should be made. The author finds that he obtains the best and most constant results by using a rectal wash of iodine (1 gram iodine, and 2 grams iodide for a litre of water). He gives this in the morning. Two or three hours after, the patient passes some slimy mucus containing cellular elements of all kinds, white and red corpuscles, and rarely parasites. In the

faeces passed by the patient in the evening or next day cysts and also amoebae may be found in large numbers. This result may be obtained in patients who for several weeks have had absolutely normal faeces and where repeated microscopical examination has failed to reveal the presence of infection.

In 6 per cent. of his cases cysts were still present at the end of 4–5 months in spite of emetin-arsenic treatment. The author prefers to rely solely on emetine in treating acute cases, and repeats the course, four or five times if necessary. Novarsenobenzol, while not giving him such good results as emetine in the acute stages, was of value subsequently.

B. B.

BAYMA (Theodoro). **A dysenteria amoebica em S. Paulo. Frequencia—Epidemiologia—Prophylaxia.**—*Ann. Paulis. Med. e Cirurg.* 1916. Nov. Vol. 7. No. 5. Year 4. pp. 97-108.

This paper is a general one which emphasizes the fact that in S. Paulo amoebic dysentery occurs in endemo-epidemic form. Microscopical examinations of faeces reveal an increasing number of positive findings, rising from ·1 per cent. of 3,419 faeces in 1912 to 8·5 per cent. of 4,717 faeces in 1915. The usual modes of infection are dealt with and most authorities on the subject are quoted. Besides the danger of contaminated water and vegetables, fly transmission, direct contagion, and human carriers, the possibility of certain animals, as rats (LYNCH) [see this *Bulletin*, Vol. 7, p. 198], acting as reservoirs of infection is mentioned. Prophylaxis and prophylactic elimination of carriers are considered.

B. B.

LEBOEUF (A.) & BRAUN (P.). **Resultats de l'examen microscopique de 436 selles. Fréquence de l'amibiase autochtone intestinale et hépatique.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Oct. 26. 3 Ser. Vol. 32. No. 27–28. pp. 1602–1607.

In the course of the above examinations amoebic dysentery was the diagnosis in 28 cases; 8 of these had been in the colonies, 20 had never left France. From September to December, 1915, *E. histolytica* was found 5 times, whereas from January to July, 1916, the organism was present in 23 cases.

Examination was made of material from autopsy in five cases of large hepatic abscess and the findings are given for each case. [It appears to be implied, although not expressly stated, that these cases had not been out of France.] All five presented typical amoebic ulcers of the colon, and living amoebae were found as follows:—Colon and wall of abscess cavity, 2 cases; colon and abscess pus, 1 case; colon alone, 1 case; pus alone, 1 case.

Infection with Trichomonas was observed 13 times and *Giardia intestinalis* only once. In this case the authors consider it to have played a pathogenic role.

B. B.

RAVAUT (Paul). **L'amibiase chronique en France à la fin de l'année 1916.**—*Presse Méd.* 1917. Feb. 8. Vol. 25. No. 9. pp. 81–83. With 23 text figs.

Since the commencement of the war amoebiasis has attracted much attention in France as elsewhere. The presence of this affection in African regiments is not a matter for surprise, seeing that it is endemic in the country from which they come. What is more important is the study of the forms which it may assume in colder climates. Here there may be no acute attack of dysentery, or the original attack may be so slight as to pass almost unperceived. A gradually increasing muco-colitis is frequent with the possibility of liver abscess developing at any time; diarrhoea may be very slight or absent. Several cases are quoted. The author considers it probable that amoebiasis will persist in France after the war, but assume a latent character.

B. B.

YAKIMOFF (W. L.). **La dysenterie amibienne en Russie.**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 125–137.

The paper consists of a historical record of the opinion of various authors as to the occurrence or not of amoebic dysentery endemically in Russia. The evidence of those who affirm is weighed against that of those who deny its existence. The author comes to the conclusion that amoebic dysentery does occur in certain parts of Russia in endemic form.

B. B.

BLOCH (Marcel). **L'amibiase suraiguë.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Nov. 23. Vol. 32. 3 Ser. No. 31–32. pp. 1839–1851. With 4 text figs and 7 charts.

A series of 10 cases of amoebiasis in soldiers came under the author's observation; several points of interest presented themselves. In order to bring out these points the author sets out to give an account of each case in order, dealing with the onset of the disease, duration, signs and symptoms and findings at autopsy. [Details are given however of seven cases only.] Of the seven recorded, five had never been out of France, several had symptoms which entirely failed to give a clue to the causation of their illness, and all died after a short period. In every one ulceration of the gut was found limited to the large intestine, all had abscess, single or multiple, in the liver, and in five amoebae were found in the abscess pus, abscess wall, or in scrapings from the ulcers; in one amoebae were found in the faeces only.

The duration of the disease varied from a fortnight to six weeks; and a common origin of infection was excluded because the men did not come from the same area. In proposing the name given in his title for this form of amoebiasis the author mentions that a tendency to regard this disease as essentially a chronic condition may lead to serious error, and he dwells on the comparative rarity of dysenteric symptoms in his cases. He finds it difficult to explain why in France

the condition should be so acute, and suggests on the one hand increased virulence of the strain of amoeba and on the other hand the age—all over thirty—of his patients and their lack of resistance owing to the hardships they had undergone.

B. B.

CARLES (Jacques) & FROUSSARD. **Les lésions recto-coliques de la dysenterie amibienne. Leur étude sur le vivant, par l'examen recto-sigmoidoscopique.**—*Presse Méd.* 1917. Mar. 15. Vol. 25. No. 16. pp. 154–156. With 4 text figs.

The examination by means of the rectoscope and sigmoidoscope of 200 patients showed lesions in 25 which the authors consider almost certainly to have been cases of amoebic infection. Dysenteric amoebae or amoebic cysts were found on several examinations in 12 of these, while in the same 12 sero-diagnosis as regards bacilli of dysentery was negative ; these 12 the authors consider certainly cases of amoebic dysentery. Very rarely were lesions found beyond 20 cm. from the anal orifice, although the instrument of Friedal could be used up to 35 cm.

Acute cases. The lesions in two cases were those of diffuse mucopurulent rectitis. The rectum had lost its ampullary shape, and appeared as a narrow tube with rigid walls, about 2 cm. in diameter and permitting the insertion of the rectoscope only with difficulty. The mucosa was bright red, covered in places with a whitish substance consisting of muco-pus streaked with blood. On wiping off this discharge the mucous membrane was seen to be covered with small elevations of the size of a millet seed, close together, soft and bleeding at the slightest touch. In a few days these intense inflammatory lesions had almost completely disappeared under treatment with emetine combined with permanganate rectal injections 1–6,000. No deep ulceration or abscess was seen.

Subacute and chronic cases. In these cases the lesions varied considerably, and are described under the following headings :—A.—Infiltration with induration of the submucosa ; B.—Oedema of the mucous membrane ; C.—Congestion with ecchymosis ; D.—Proliferation and polypoidal degeneration ; E.—Desquamation and ulceration ; F.—False membranes.

In conclusion the authors say that it appears to them impossible to diagnose the amoebic origin of such cases by the rectoscope, as the lesions presented no distinctive points.

B. B.

KLEIN (Alexander) & RUBENSTONE (A. I.). **Visceral Amebiasis. With Report of an Unusual Case.**—*New York Med. Jl.* 1917. Jan. 13. Vol. 105. No. 2. Whole No. 1989. pp. 67–68.

A Russian who complained of pain in the right buttock was X-rayed. "Above and to the inner side of the pelvis from the acetabulum to the right sacroiliac synchondrosis was a mass of fluid consistence." Six ounces of yellowish brown fluid were withdrawn and examination revealed cells from 20–50μ in diameter, showing typical amoeboid movement, which in some was very active. The patient had also

fluid in the left side of the thorax, on which puncture was performed, five ounces of fluid being removed. The fluid resembled that from the buttock and similar amoebae were present. The authors conclude they were dealing with *E. histolytica*, and speculate on the condition of pyorrhoea with numerous amoebae which the patient had, as the source of the infection.

B. B.

IMRIE (C. G.) & ROCHE (W.). **Report on Six Cases of *Amoeba histolytica* Carriers treated with Emetine Bismuthous Iodide.**—*Lancet.* 1917. Jan. 6. p. 17.

Emetine bismuthous iodide, which was introduced by Du Mez [see this *Bulletin*, Vol. 6, p. 446] for the treatment of amoebiasis, and on the efficacy of which first DALE, then LOW and DOBELL [*ibid.* Vol. 8, p. 441], advanced evidence, was administered by the authors to six cases which were carriers of *Entamoeba histolytica* cysts. The results obtained in these six cases confirm those of the investigators mentioned above. [In the protocols, Case 6, the cysts appear to have ceased passing before the commencement of treatment.] Oral administration of three grains on 12 successive nights caused the cysts to disappear within 48 hours of the institution of treatment in five of the cases. The sixth case continued to pass cysts for six days, after which the microscopical findings were negative. If this drug was given with water at 10 p.m. nausea and vomiting were less evident than when given after supper at 7 p.m.

The authors draw attention to the fact that of their six cases, four had already undergone a course of daily hypodermic injections of one grain of emetine hydrochloride for 10 or 12 days without ceasing to pass cysts. One case had had no history of dysentery. The period during which the cases were observed after the cessation of treatment was in 3 cases 32 days, 1 case 23 days, 1 case 13 days, 1 case 2 days [? 32 days].

B. B.

LOW (George C.). **Further Experiences with Emetine Bismuth Iodide in Amoebic Dysentery, Amoebic Hepatitis, and General Amoebiasis.** —*Lancet.* 1917. Mar. 31. pp. 482–485.

Two of three cases of infection (*E. histolytica*) treated by emetine bismuth iodide described by DOBELL and the author [see this *Bulletin*, Vol. 8, p. 441] have been followed up accurately for six and seven months. Neither has had any recurrence of parasites in the stools, and one has had no further clinical signs of dysentery. The value of the double iodide of emetine and bismuth in the treatment of *histolytica* carriers is now fully recognised. Three cases in which amoebic hepatitis was present are described in the paper, and a case of what the author terms "general amoebiasis," that is "a febrile state without dysenteric and manifest liver symptoms, yet responding quickly to treatment by emetine." *E. histolytica* cysts may be found only with great difficulty, but if sufficient numbers of faecal examinations are made they should eventually be demonstrable. Two convalescent carrier cases and a relapsing amoebic dysentery

26 years after original infection are detailed. In each of these cases a course of emetine bismuth iodide produced very good results. Tables are included in the paper showing the results of treatment in the above cases, with the dates of treatment and microscopical examinations. The author concludes by drawing attention to the necessity of using the emetine bismuth iodide in proper dosage. Not less than 36 grains in all (a three-grain dose every night for 12 consecutive nights) should be given, as smaller quantities are generally followed by relapse.

B. B.

SIMON (Sydney K.). **Recent Experience with Ipecac and its Alkaloids in the Treatment of Amoebiasis.**—*New Orleans Med. & Surg. Jl.* 1916. Dec. Vol. 69. No. 6. pp. 457–462.

In view of the widespread use of emetine as a therapeutic agent in cases of amoebic dysentery during the years which have elapsed since VEDDER [see this *Bulletin*, Vol. 1, p. 175] drew attention to the alkaloid as a potent amoebicide *in vitro*, the author considers it is advisable to compare the results obtained by it with those obtained by the use of the parent drug ipecac. George DOCK in 1909, and soon after him the author, reported good results from the use of salol-coated pills of ipecac in amoebic dysentery. Striking as are the clinical effects produced by emetine, it is urged that equally striking results might be obtained by oral administration of powdered ipecac. The real test, however, is the prevention of relapse and in this respect the author considers that ipecac possesses a far greater value than emetine. With cephaline the author has had more success than ROGERS. He states that as an amoebicide it equals emetine, while as a means of dealing with cysts it appears to afford more promise of success. He mentions one case in which relapse did not occur for five months, cysts not reappearing in the stools during that time, subsequent to cephaline treatment. He suggests a combination of the alkaloids.

B. B.

STEPHENS (J. W. W.) & MACKINNON (Doris L.). **A Preliminary Statement on the Treatment of *Entamoeba histolytica* Infections by "Alcresta Ipecac."**—*Ann. Trop. Med. & Parasit.* 1917. Feb. 8. Vol. 10. No. 4. pp. 397–410.

Alcresta ipecac [see this *Bulletin*, Vol. 8, p. 113] is the trade name for an adsorption compound of ipecac alkaloids with hydrated aluminium silicate (Fuller's Earth). It is made up in tablets each of which contains 0·15 grains of emetine.

The advantage claimed for this form of emetine is that it passes through the stomach unchanged and liberates the alkaloids in the alkaline intestinal secretion; and that patients taking emetine in this form suffer little if at all from the nausea and sickness that are so unpleasant a feature of some other forms of emetine treatment. The authors after some preliminary essays in dosage and duration of treatment adopted a standard course of 14 days' treatment with 10 tablets daily, 5 night and morning, amounting to 1½ grains of emetine per day for a fortnight.

As a result of their experience of this compound the authors are able to endorse fully the convenience of the drug and the absence of unpleasant symptoms. This factor is of great importance in that patients who relapse can at once be put on a second and if need be a third course, without suffering any discomfort.

As regards results, the authors lay some emphasis on the importance of daily microscopical control for as long a period after treatment as possible. Eighty-one cases harbouring cysts of *E. histolytica* have been treated with alcresta ipecac. and the authors' summary shows the results to be as follows :—

13 left hospital immediately treatment stopped.
12 have not yet finished a first course of alcresta.
38 have not relapsed under observation subsequent to treatment.
14 have relapsed, *but at least four of these have subsequently cleared up on a second or third treatment*, and some of the remainder may yet do so.
4 are completely unaffected by the treatment.

81

The 38 patients became negative on an average three days after treatment began, and showed no cysts in their faeces during a long series of consecutive examinations extending through the period of treatment and for a reasonable length of time afterwards : 23 of these were negative for three weeks and more after treatment and it was possible to follow some of them for seven weeks and more.

Of the alcresta treatment the authors say, "while we cannot pretend to rival the amazing results obtained by the use of biniodide at Walton Hospital (of 25 men treated with biniodide of emetine and bismuth *none* relapsed under observation) our results do compare very favourably with those obtained by the hypodermic injection of emetine hydrochloride - 70 per cent. of the cases at Walton Hospital relapsed after this treatment (Dobell), and 57 per cent. at the Kitchener Hospital, Brighton (Jepps)" [see this *Bulletin*, Vol. 9, p. 178–9].

B. B.

Job (M. E.) & Hirtzmann (M. L.). i. **Dysenterie amibienne et chlorhydrate d'émétine.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Oct. 26. 3 ser. Vol. 32. No. 27–28. pp. 1488–1500.

ii. **Note sur quelques symptomes observés au cours de la dysenterie amibienne.**—*Ibid.* pp. 1500-1506.

i. The authors give their experience with hypodermic emetine treatment in 254 cases. In 131 the results were very good; that is, the motions became formed and reduced in number to one or two daily; in 66 the motions remained unformed and numbered two or three; in 49, although mucus and blood disappeared, diarrhoea persisted; 8 died.

Cysts were found in 28 per cent. of convalescents who had had one or more courses of emetine, the dosage being 8 centigrammes daily given in two injections and the duration three, four or five days.

Ipecac by the mouth was used afterwards to supplement the course. At two autopsies the authors were able to convince themselves that emetine brings about healing of amoebic ulcers.

They discuss relapses and their causation and give details of cases in which repeated relapses occurred and were temporarily successfully treated by emetine. Schizogony forms protected by their situation in the cicatricial pockets formed by old ulcers, appear to them to be the point of origin of relapses; they do not think that autoinfection from cysts occurs.

ii. This is a paper which deals with the clinical signs, symptoms, appearance of the stools, and the general effects on the patient, of amoebic dysentery.

B. B.

RAVAUT (Paul) & KROLUNITSKY (Georges). **Le traitement mixte de la dysenterie amibienne par les cures émétino-arsenicales.**—*Paris. Méd.* 1917. Jan. 6. Vol. 7. No. 1. pp. 18–24.

Amoebiasis should be regarded as essentially a chronic disorder. Crises occur between which the infection is latent; in some cases two crises may be separated by years of perfect health. Protozoal diseases are not necessarily cured simply because they are producing no symptoms. Latency is the feature which should be emphasized. Hence treatment by repeated courses of emetine was introduced by CHAUFFARD, applying to this condition the methods employed with success in syphilis and trypanosomiasis.

Arsenical salts have several times been reported to have greatly ameliorated or cured amoebic dysentery in syphilitics to whom they were administered. Emetine alone is of great value but frequently fails, and if given in large doses over long periods has a depressant action. The combination of arsenic and emetine treatment is recommended by the authors. The emetino-arsenical treatment is administered as follows for acute cases:—A series of 10 intravenous injections of 0·30 gm. of novarsenobenzol is given, an interval of two days intervening between the injections. On each of these two intervening days 2 to 6 centigrammes of emetine are injected. Where patients can retain them, rectal injections are given of salvarsan and neosalvarsan, 0·15 gm. in 150 cc. water to which a few drops of Tinct. opii are added. A second course of treatment is given after a fortnight to such cases as are passing cysts.

Novarsenobenzol, 5–10 centigrammes in keratin-coated capsules, is well borne by the stomach and can be used for ambulant treatment. The authors condemn the habit of first trying one remedy until it proves a failure and then starting another. They argue that amoebae which become resistant to emetine will soon also become so to arsenic. They urge on practitioners a combined emetine arsenical course of treatment, to be repeated as often as required by the persistence of the parasite. Patience both on the part of the physician and the patient will be required. They have treated 150 cases of amoebic dysentery in this way and have had no deaths and no liver complications.

B. B

FROUIN (Albert). **Action des sels de thorium sur la dysenterie amibienne. (Note préliminaire).**—*C. R. Soc. Biol.* 1917. Feb. 3. Vol. 80. No. 3. pp. 136–138.

Two cases of intractable amoebic dysentery were treated with sulphate of thorium orally and rectally with good effect. The dose used was 4–6 grams daily in cachets by the mouth with food; while 4 grams were also administered daily as a rectal injection in 200 cc. The first case had previously received about 50 injections of emetine and had also had ipecac by the mouth, but the stools still averaged six daily. After nine days' treatment by thorium the number of stools was reduced to one daily, and three months afterwards the patient reported her continued freedom from any intestinal trouble. The second case could not be followed for long but the immediate improvement was definite.

B. B.

ESCOMEL (E.). **A propos du meilleur traitement actuel des amibiases intestinale et hépatique.**—*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 23–28.

A statement of the methods by which the author has for a long time treated his cases of amoebic dysentery and liver abscess. Emetin injections 0·02 gm. of the hydrochloride, up to the number of 30 in chronic cases, form the basis. At the same time tannalbin and simiruba by the mouth (formula given) and rectal injections twice a day of a litre of decoction of eucalyptus and subsequently a litre of 1–1,000 protargol are administered. The patients are kept on carbohydrate diet. For aged and debilitated individuals an injection of spartein 0·05 gm. is given along with the emetine injection.

The author has been fortunate in his emetine treatment of liver abscess which, he states, he has always cured without evacuation by puncture. It suffices, he says, to inject emetine till all the amoebae are dead and the cysts sterilised, whereupon the abscess is absorbed spontaneously and completely. Thirty daily injections have been up to the present enough to produce complete sterilization in all the author's cases of hepatic abscess. He recommends the use of emetine as a diagnostic agent, in suspected cases.

B. B.

LOW (George C.). **A Case of Amoebic Abscess of the Liver occurring Twenty Years after the Original Attack of Dysentery.**—*Brit. Med. Jl.* 1916. Dec. 23. pp. 867–868. With 1 chart.

The author points out that it is known that a person who has been exposed to infection with *Entamoeba histolytica* may become infected and have dysentery and hereafter become a relapsing carrier, or he may without any dysentery or diarrhoea become a contact carrier. In either case he may live for many years and have no trouble in the shape of liver complications. On the other hand, for reasons which are at present not clear, he may suddenly develop liver abscess. Low then proceeds to give details of a case of such late development. The patient had a history of dysentery contracted at Port Said 20 years ago, followed by slight attacks of diarrhoea for two or three years, and since then no bowel complaint. No amoebae nor cysts

were found on several examinations after admission to hospital, but the symptoms and signs pointed to abscess of the liver. After the administration of emetine was commenced, a dead amoeba and two *histolytica* cysts were found. There was some amelioration of the symptoms and it was decided to explore the liver, but the patient died suddenly of cardiac complications during the night preceding the date fixed for the operation. At autopsy an abscess was found in the right lobe of the liver. Live amoebae were present in a scraping from the wall of the abscess cavity. There were no signs of chronic encystment of the abscess. In the caecum were found two small crypts with thinned areas in the vicinity resembling healed ulcers ; in neither of the crypts were amoebae or cysts found. Of interest is the fact that live amoebae were found in the abscess 13 hours after death, and also that the patient had had 4 grains of emetine hydrochloride which had not killed the amoebae. Gross lesions of the large intestine were practically absent, which seemed to bear out the patient's statement that he had only one attack of dysentery and that 20 years ago.

B. B.

GRALL (C.). **Amibiase hépatique à l'Armée d'Orient (Formes frustes).** —*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 17–22. With 6 charts.

Bacillary dysentery occurring in a person who is parasitized by amoebae becomes greatly enhanced in gravity, and lesions which had remained dormant become active, with liver abscess as a common complication. In a similar way the author suggests that aestivo-autumnal malaria is a frequent cause in determining an acute attack where amoebiasis is latent, the liver being frequently involved.

He finds that of those troops who had previously served in the Dardanelles, and later contracted severe malaria at Salonika, more than half presented the reactions of hepatic amoebiasis. He advises courses of emetin repeated periodically.

B. B.

FAULDS (A. G.). **Liver Abscess amongst our Soldiers.**—*Glasgow Med. Jl.* 1916. Dec. Vol. 86. New Series. Vol. 4. pp. 337–340.

Of a total of about 50 cases of amoebic dysentery from the East and South which the author has seen, he opened the abdomen in 21 cases and of these 16 had liver abscess, two had perforation of the bowel and in the remainder nothing could be found. None of the cases were over 40 years of age, none were alcoholics, almost all had had malaria. Amoebae were found in the contents and wall of the abscess in all cases and also in the stools. [No details are given of the subsequent history of these cases with the exception of two.] In one case a cerebral abscess in the right occipital lobe, an empyema on the right side, and a liver abscess were operated on in succession at a few days interval. The author discusses the mode of infection, and expresses the opinion that no liver, lung, or brain lesion takes place in amoebic dysentery until the amoebae invade the blood.

B. B.

GHOSH (Hari Nath). **The Treatment of Liver-Abscess by Intra-Hepatic Injections of Emetine following Aspiration.**—*Calcutta Med. Jl.* 1917. Jan. 8 pp.

Five cases are given in detail in which the author after evacuation of abscess of the liver by aspiration injected into the cavity ½ to 1½ grs. of emetine hydrochloride in 20 cc. of normal saline, with good effect. Hypodermic injections were also given in these cases in daily injections of ½ to 1 gr. for periods varying from six days to 11 days in four of the cases, and 30 days (1 gr.) in the fifth case. The author first treated a case in this manner in June, 1915. He considers that a direct effect on the vegetative phase of the amoeba in the liver can be obtained better in this way than in any other. He proposes to use a 2 gr. dose for intra-hepatic injection, and by this means hopes to reduce the expense of treatment, while increasing its efficacy.

Dr. K. D. BANERJI pointed out that in 1912 Sir Leonard ROGERS recommended intrahepatic injections of emetine, which proved no better than injections of quinine. The important point was proper evacuation of all the pus.

B. B.

GRUSSENDORF (Th.). **Zur Behandlung der dysenterischen Leberabszesse.** [Treatment of Dysenteric Liver Abscess.]—*Münch. Med. Woch.* 1916. Oct. 17. Vol. 63. No. 42. pp. 1503–1505.

From 1904 to 1916, 25 cases of liver abscess subsequent to dysentery came under the author's observation. Four of these either declined operation or died before operation, 21 were operated on. All 25 were males and with the exception of six were between 20 and 50 years of age. The abscess was almost always single and of large size (containing a litre or more of pus), and in all except two cases was situated in the right lobe of the liver. High temperature was by no means common, while subfebrile temperature running on for weeks or months was frequent. Of the 21 cases operated on the first 14 were treated by wide single or double incisions. Eight of the 14 died, four within five days of acute cardiac failure, four later of secondary infection. The average convalescence of the six who recovered was one month and 21 days.

The author gave up this method and adopted a modification of MANSON'S. Under local anaesthesia a Muller's trochar and cannula of large size are introduced either below the costal margin or between the ribs, and the trochar having been withdrawn the cannula is retained in position by plaster. Emetine injections are given at the same time. Of seven cases so treated, six recovered, the one exception being a boy of five years who was moribund at the time of operation. The convalescence period was reduced to an average of 29 days.

B. B.

AMEUILLE (P.) & TILLAYE (P.). **Hépatite amibienne suppurée autochtone et primitive.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Oct. 26. 3 ser. Vol. 32. No. 27–28. pp. 1448–1452.

The facts that a person has not been out of France, and that he has never had diarrhoea, are not sufficient to exclude the possibility

of his having liver abscess of amoebic origin. The authors give in detail an account of a case which leads them to the above conclusion.

A case, admitted as pleuropneumonia of the right base, did not present features which confirmed this diagnosis. In fact the authors diagnosed cholecystitis and biliary calculus, and proceeded to surgical intervention. On opening the abdomen however they found the gallbladder to be normal. Exploratory puncture of the liver produced pus of yellow colour, in which numerous amoebae were found. The patient rallied after operation and the temperature came down for a day, but he died suddenly the morning following.

On post-mortem examination the small intestine presented no abnormality. The caecum and ascending colon showed discrete ulcers from which the rest of the large intestine was free. The liver was enormously enlarged and was crowded with abscesses full of yellow pus. The left suprarenal was haemorrhagic and much enlarged and amoebae were found in large numbers in the intestinal ulcers and in the liver abscess. Cultures taken from the pus in the liver were negative.

The authors remark upon the rapidity of the fatal issue of this case; the patient appeared and felt quite well 10 days before his death in spite of the fact that his liver was honeycombed with abscesses. They cannot explain why the puncture of one, and that a small one, should have caused an apparent amelioration of his condition, and conclude that the suprarenal insufficiency precipitated his death [see this *Bulletin*, Vol. 8, p. 440].

B. B.

Cropper (J. W.) & Row (R. W. Harold). **A Method of Concentrating Entamoeba Cysts in Stools.**—*Lancet.* 1917. Feb. 3. pp. 179–182. With 3 text figures.

With a view to obtaining the causative organism of amoebic dysentery in a condition free from bacteria and faecal matter, attempts were first made along the lines of Bass's method of concentration for helminth ova as modified by Cochran [see this *Bulletin*, Vol. 7, p. 368]. The cysts of *E. coli*, however, proved too fragile to withstand the osmotic currents set up by the concentrated calcium chloride solution; other substances such as syrup, glycerine and albumin gave no better results. The authors conclude that there is probably no specific gravity method of differentiation between cysts and faeces which will avail for entamoebae.

By the use of the methods described below they are able to obtain the cysts practically free from bacteria and from the major part of the faeces. Although the majority of their experiments were performed with *E. coli* cysts on account of the ease in obtaining material, the method has proved equally applicable to *histolytica* and Lamblia cysts.

The maximum concentration of cysts for diagnosis is obtained as follows. Faeces and saline in the proportion of 1 gram faeces to 30 cc. saline (·8 per cent. sol. of NaCl) are shaken—in a flask or bottle of a capacity at least four times the amount of fluid to be shaken—on a shaking machine. A minimum of half an hour is required for this process. The emulsion is poured into a separating funnel and

shaken up by hand for half a minute with 10 to 20 per cent. of its volume of ether, and allowed to stand for a minute or two in the funnel. The faecal matter absorbs ether and rises to the top of the saline, while the cysts remain in the saline beneath. The saline is then drawn off and centrifuged at low speed for two or three minutes, by which means the cysts are brought down together with the small amount of faeces not taken up by the ether. The concentration thus effected should be some 15 times as rich in cysts as the original material.

For the purposes of culture a method of relative concentration is described in which the use of ether is dispensed with. *Amoeba limax* cysts submitted to this process have been cultivated subsequently without difficulty.

A method for counting Entamoeba cysts in stools is given. Glass slides 3 × 1½ inches are used, and on them a ring of vaseline is made, 1 inch in diameter. In the centre of the ring 20 cmm. of a faecal emulsion (10 grams faeces in 100 cc. normal saline shaken for 10 minutes on shaker) is placed and a coverslip ruled in squares, such as is used with Böttchers slides, is deposited, engraved side down, on the drop. The count is made with the low power.

B. B.

MATHIS (C.) & MERCIER (L.). **Identification des kystes des entamibes intestinales de l'homme.**—*Presse Méd.* 1917. Feb. 22. Vol. 25. No. 12. pp. 114–116. With 1 text-fig.

This paper classifies the cysts of *E. histolytica* and *E. coli* in three groups: (1) ripe cysts, (2) developing cysts, (3) degenerating cysts; with subdivisions of the groups. Typical ripe cysts of either species are easy to identify in the faeces. When ripe cysts of typical dimensions are found, then if they measure less than 14μ they are *E. dysenteriae*, if more than 16μ they are *E. coli*. Cysts having 1–4 nuclei but no chromidia, and measuring 14μ to 16μ, may be either *E. histolytica* or *E. coli*.

Typical ripe cysts are defined as follows:—

E. histolytica.—Four nucleate, have chromidia, measure 12·5μ or 14μ in fresh preparations, nuclei 1·5μ to 2·5μ.

E. coli.—Eight nucleate, have no chromidia, measure 16·5μ, 18μ and 19μ in fresh preparations, nuclei 2.5μ to 3μ.

B. B.

RIEGEL (W.). **Einiges über Ruhr und vorläufige Mitteilung eines einfachen Verfahrens zur Schnellfärbung von Ruhramöben zu diagnostischen Zwecken.** [A Simple Process for the Rapid Staining of Amoebae for Diagnosis.]—*Münch. Med. Woch.* 1916. Oct. 17. Vol. 63. No. 42. pp. 1493–1495.

After a general discussion of the questions as to whether and to what extent amoebic dysentery occurs in Germany, the author proceeds to describe a method by which he considers that the diagnosis of amoebic dysentery can be much facilitated. It consists of a process of rapid staining, which can be utilized in cases where amoebae and cysts are scanty. The advantages of the method are

stated to be, as compared with the older methods of wet-fixation and staining, simplicity, rapidity, differentiation of living from dead forms and selective staining of amoebae and cysts; as compared with vital staining methods, the facts that comparatively thick layers of material can be examined and that examination may be made at any time within 24 hours.

The disadvantages are lack of definition of the internal structure of Entamoebae and cysts, insufficient staining of certain old forms of *E. coli* cysts and the cysts of other intestinal protozoa, and the fact that permanent preparations are not obtained.

Five grammes of Borax are dissolved in 100 cc. of hot distilled water and then 2 grammes of pure Methylene Blue added. 1 cc. of this solution and 10cc. chloroform are shaken in a test tube. The chloroform, coloured deeply, settles at the bottom, and is carefully pipetted off and filtered. In order to avoid water accidentally taken up on the pipette getting into the stain the last portion in the filter funnel is thrown away. Smears are made on coverslips which are dipped still wet in the chloroform stain. When stained (20–40 secs.) the coverslip is mounted still moist with a small drop of paraffin oil.

B. B.

SWELLENGREBEL (N. H.) & SCHIESS (J. R.). **Quelques remarques sur la morphologie de l'*Entamoeba histolytica* et la valeur diagnostique de l'infection rectale des chats.**—*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 13–17. With 4 figs.

KUENEN and SWELLENGREBEL [see this *Bulletin*, Vol. 9, p. 76] showed that *minuta* forms of amoeba multiply independently of the *histolytica* forms and can produce not only cysts but also *histolytica* forms. The authors record a case which bears out this statement. In 1898 a patient who had no previous dysentery had an abscess of the liver which was operated upon, in the Netherland Indies. In 1899 the patient, who had returned to Europe, had an attack of dysentery and was treated with ipecacuanha, tannin and bismuth. Until 1915 he remained well and had no intestinal trouble, but in November of that year dysentery came on, and in June, 1916, *histolytica* type amoebae were discovered by the authors in his stools which contained blood and mucus. Emetine treatment caused the disappearance of the *histolytica* forms in a few days but on 28th June *minuta* forms made their appearance, and remained present for two months, whereas the *histolytica* forms did not reappear. The *minuta* forms were not in the least influenced by emetine, which shows that these are independent of the *histolytica* forms. On 25th August *tetragena* cysts appeared, and among these eight-nucleate cysts which the authors are convinced belong to *E. histolytica*, because they had the patient under observation for more than three months and had found no trace of *E. coli* during that period. [No measurements are given nor the means by which the authors would have distinguished these cysts from those of *E. coli* if it had been present.]

The authors had no difficulty in carrying on the strain in cats to the sixteenth passage by rectal injection. They found no evidence of degeneration of the amoebae nor of cyst formation mentioned by DARLING [see this *Bulletin*, Vol. 2, p. 389] as a result of successive inoculation into cats. The amoebae must be examined before, not after, the death of the animal. A point of great interest is that the

cat amoebae while resembling the human *histolytica* forms in their activity, their well-developed ectoplasm and their cytoplasmic inclusion of erythrocytes, differ in that their nucleus possesses a thick chromatic membrane.

The ulcerations of the intestine were found by the authors to be less deep in cats than in man. In their sections they never saw amoebae which had penetrated into the muscular layer.

B. B.

CRAIG (C. F.). **The Classification of the Parasitic Amebae of Man.**—*Jl. Med. Res.* 1917. Jan. Vol. 35. No. 3. Whole No. 160. pp. 425–442.

Of the classifications of amoebae by CHATTON, ALEXEIEFF, DOFLEIN, HARTMANN and CALKINS, the author prefers that of CALKINS which furnishes "an excellent working basis for the differentiation of amebae and, if followed, will result in great good in clearing up the chaotic condition in which the study of these organisms has remained for so long." The genus Vahlkampfia, of which many species may be cultivated from human faeces, contains only one species parasitic in man, *V. lobospinosa* Craig, 1912. The genus *Craigia* contains two human parasitic species, *C. hominis* Calkins, 1912, and *C. migrans* Barlow, 1915 [see this *Bulletin*, Vol. 6, p. 467]. BARLOW in Honduras confirmed the observations of the author on the morphology and cycle of development of *C. hominis*, and also discovered a new species of which the characters are given :—

"There is an amebic and flagellate stage of development. In the amebic stage the organisms measure from 12 to 30μ, average about 20μ. Encysted stage measures about 18μ. The young flagellates measure from 3–5μ and there are 40 or more in a cyst Endoplasm granular and contains a nucleus, but no accessory nuclear body. Flagellated forms are circular in shape and have a single flagellum. Multiplication of the amebic stage is by simple division and in the cysts by the formation of swarmers which are flagellated, and the cyst may contain from 20–40 of them. No multiplication occurs in the flagellate stage, the flagellate form, as soon as fully developed, becoming an amoeba. Habitat, the human intestine where it produces severe dysenteric lesions, and in some instances the liver is invaded and abscesses result."

The author considers that infections with both *C. hominis* and *C. migrans* (BARLOW studied 51 cases of the latter) are probably much more numerous and widespread than is supposed, owing to the liability of confusing these parasites with other amebae, or during the flagellated stage of development, with cercomonads or trichomonads.

The genus Endamoeba contains three species parasitic in man, *E. coli*, *E. histolytica*, and *E. gingivalis*. The characteristics of these species are given. Of the trophozoites, the author states *E. coli* is not normally phagocytic for red blood corpuscles ; *E. histolytica* and *E. gingivalis* are normally actively phagocytic for red blood corpuscles. The measurement of the cysts is given as *E. coli* 10μ–30μ ; *E. histolytica*, 10μ–20μ; *E. gingivalis* 8μ–10μ (although larger cysts have been observed). [It would be of value if observers would state a figure showing how often, if ever, they were quite unable to make a diagnosis between *E. coli* and *E. histolytica*, even when utilizing every means at their disposal, and also the standard used.]

B. B.

SWELLENGREBEL (N. H.) & RADEN MAS MANGKOE WINOTO. **The Life-History of Amoebae of the Limax Type in the Human Intestine.** —*Parasitology.* 1917. Feb. Vol. 9. No. 2. pp. 266–273. With 1 plate.

Limax-type amoebae were observed in three cases; in all both amoeboid stages and cysts were discovered, but whereas the forms found in the first case corresponded closely with cultural forms of limax, the cysts in the other two cases differed in their morphology from cultural cysts.

The amoebae and cysts observed in the latter two cases are described and figured as they appeared in fresh material and in fixed and stained preparations. The authors note that the amoebae died very quickly outside the body and that after the administration of a strong purgative the motile forms found were not only more active but more resistent, thus pointing to their being real parasites of the ileum or possibly the jejunum.

Culture was not successful even when many motile forms and cysts were present in the stool. The cysts were very resistant, remaining alive in the faeces for more than a month. They contain glycogen-vacuoles which disappear within a week when the cysts are kept alive outside the body. All stages of cyst from a uninucleate to a six nucleate stage are described, the final form being four nucleate. Forms were seen which resembled four nucleate cysts, but of a larger size and devoid of cyst wall. These the authors suggest have left the cyst and are about to return to the motile form.

B. B.

FRIEL (A. R.). **Note on the Amoeboid Body found in the Urine.**—*Proc. Roy. Soc. Med.* 1917. Jan. Vol. 10. No. 3. Sect. of Path. p. 5.

The author with WARD and COLES described under the name *Amoeba urinae granulata* [see this *Bulletin*, Vol. 8, p. 118] a body averaging 25μ in diameter, which occurred "in the urine of great numbers of soldiers, in patients and in men apparently quite well." In the present paper he gives a further description of it, and states that a similar cell has been seen in a kidney section from a patient in whose urine there had been large numbers, and also in the stomach contents of another. The author suggests that cells of a body such as "protococcus" are taken into the alimentary canal, develop into zoospores, reach the blood stream, are arrested by the kidney, and develop into the bodies found in the urine.

B. B.

KEILIN (D.). **Une nouvelle entamibe *Entamoeba mesnili* n. sp., parasite intestinal d'une larve d'un diptère.**—*C. R. Soc. Biol.* 1917. Feb. 3. Vol. 80. No. 3. pp. 133–136. With 25 text-figs.

Entamoeba mesnili is the name given by the author to an amoeba which he first discovered in larvae of *Trichocera hiemalis* Meig., in Paris, and subsequently in the larvae both of *T. hiemalis* and *T. annulata* in Cambridge. The mid gut of the larva is affected;

frequently large numbers of amoebae are present, always occupying the space between the digestive epithelium and the peritrophic membrane.

The size of the parasite varies from 4μ to 24μ; the mode of progression by means of lobopodia is described and peculiarities in the protoplasm of the posterior end. In living preparations neither digestive or contractile vacuoles were observed, and the nuclei are not easily seen.

In fixed and stained specimens, 1 to 14 nuclei are seen, the uninucleate forms being very small, 4μ to 5μ. The nuclei are spherical, measuring $1{\cdot}2\mu$ to $2{\cdot}2\mu$ in diameter, each containing a compact karyosome, and having very little peripheral chromatin. The multinucleated forms are not precystic stages, because they move freely, have all the characters of vegetative forms and undergo division by a process of simple constriction into two, each half taking half the nuclei. Cysts are common and measure 8μ to 11μ and have usually two nuclei, but three or four may be found.

The author discusses plurinucleate vegetative forms resulting in multiple schizogony described in *E. dysenteriae* Councilman and Lafleur (*histolytica* and *tetragena* forms). *E. mesnili* resembles known amoebae, in its parasitic habit, its large lobopodia, and the absence of contractile vacuoles. It differs from them in possessing several nuclei throughout its vegetative life, and by the existence of protoplasm which is adherent to its posterior border.

B. B.

Bacillary Dysentery.

Pirie (J. H. Harvey). **Observations on East African Bacillary Dysentery.**—*Jl. of Hyg.* 1917. Feb. Vol. 15. No. 4. pp. 565–579.

Hitherto very little has been reported regarding bacillary dysentery in East Africa. The total number of stools examined was 56, all except one coming from patients passing blood and mucus. *E. histolytica* was found in two only. During the first day or two a marked paucity of bacteria on microscopic examination suggests the presence of amoebae although they may not be seen and indicates that emetine should be given a trial. Later on this difference between amoebic and bacillary cases does not hold. A few of the cultures were made from the scrapings of ulcers post-mortem. Dysentery-like bacilli were isolated from 20 of the 56 stools investigated.

Organisms resembling B. dysenteriae, *Shiga.*—Slight divergencies were noted in six strains isolated, such as the action on milk and failure to agglutinate. On the whole the Shiga group has been found to be remarkably constant no matter from what part of the earth the strain was isolated and its characters tend to be stable on artificial media.

Organisms resembling B. dysenteriae, *Flexner-Y.*—Several aberrant forms were obtained. Recent work goes to show that the varieties in this group are legion, so that it is hardly worth while recording the different types which were met with.

Organisms resembling Morgan's bacillus.—Eight strains were isolated which were definitely Morgan's No. 1. The patient's serum agglutinated the bacillus isolated in five out of six cases at a 1 : 50 dilution.

Other bacilli were isolated intermediate between Morgan's bacillus and Bowman's "Bac. S," which is said to be a common cause of dysentery, especially amongst children in the Philippines. The table shows the relations between these organisms.

TABLE II.

	Maltose.	Milk.	Indol.	Motility.
"Typical Morgan I"	—	Alk.	+	active
"Typical Bac. S"	AG	Clot	—	active
3 A and 3 B	—	Clot	—	active
28 B	AG	Alk.	+	slight
44 A and 45 B	AG	Clot	+	slight

45B also differed from Morgan's and Bowman's bacilli in forming acid without gas from glucose.

Polyvalent anti-dysentery serum was tried on a large number of cases and proved to be a complete failure.

[Perhaps the most interesting point in this paper is that the patient's serum possessed a certain amount of agglutinin for Morgan's bacillus in most of the cases from which this organism was isolated. Recently several attempts have been made, especially by French authors, to ascribe pathogenic properties to this bacillus but a considerable degree of doubt has been left in the writer's mind as to the truth of this, owing to the fact that they were unable to demonstrate the presence of agglutinins in the blood of any of their patients. The present communication therefore lends more probability to the contention that Morgan's bacillus may be the cause of some cases of dysentery.]

E. E. A.

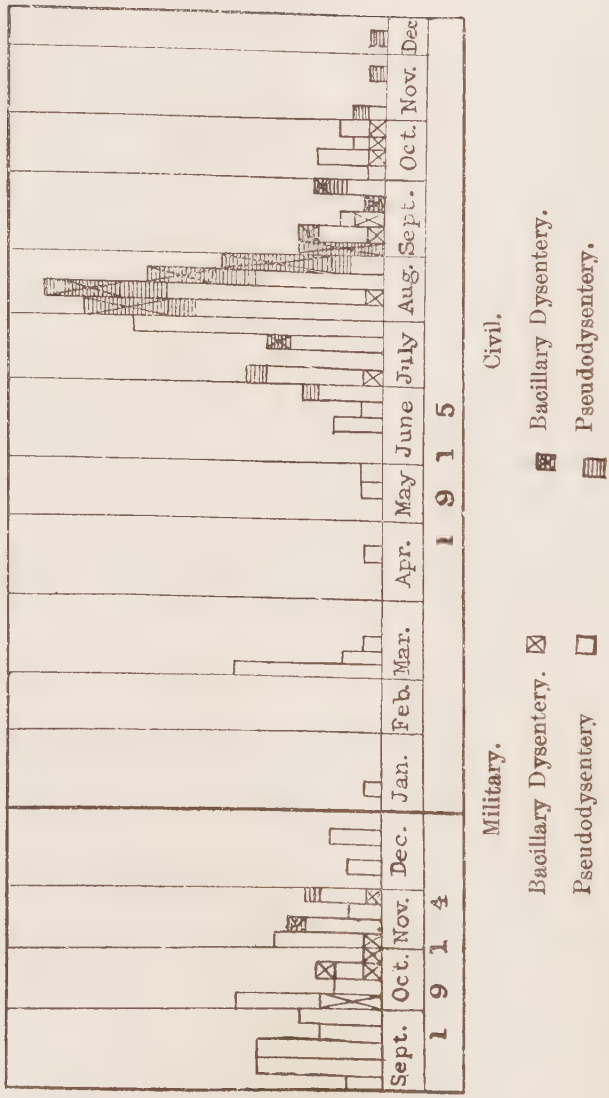
SCHUETZ (F.). **Zur bakteriologischen Diagnose and Epidemiologie der Ruhr.** [The Bacteriological Diagnosis and Epidemiology of Dysentery.]—*Deut. Med. Woch.* 1916. Apr. 13. Vol. 42. No. 15. pp. 442–446. With 1 chart.

The first part of this address deals mainly with the current work of others on the bacteriology of dysentery and calls for no further mention. An interesting chart showing the seasonal prevalence of bacillary dysentery in the region of Koenigsberg, as indicated by positive bacteriological findings, as well as the incidence amongst the civil and military population, is given (see p. 428).

The curious small epidemic in March 1915 was confined to the military and is probably closely connected with the movements of troops. It will be noted that the majority of cases are caused by the pseudodysentery bacillus or, as it is better known in this country, Flexner's bacillus. Only a few Shiga cases occurred in the army. This distribution of bacillary types holds also in peace time in the German army.

The civil population took a greater share in the summer epidemic of 1915, and among them *B. dysenteriae* Shiga was the chief causative

Incidence of Bacillary Dysentery at Koenigsberg between August 15, 1914, and December 18, 1915.



factor. Proximity to Russia, where Shiga cases are commoner than in Germany, is given as the reason.

The chart shows clearly that each epidemic begins in the army and is afterwards continued by civilians.

E. E. A.

RAVAUT (Paul). **A propos du séro-diagnostic de la dysenterie bacillaire.** —*Bull. Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Dec. 7. Vol. 32. No. 33–34. 3 ser. pp. 1920–1926.

This paper deals with the vexed question of the upper normal limit in the agglutination of dysentery bacilli, in other words what arbitrary standard are we going to set ourselves as to what is the lowest dilution of a patient's serum which can be considered diagnostic of dysentery. In June and November 1915 the Pasteur Institute issued a memorandum to laboratories in which it was stated that for the Flexner-Y group a dilution of the patient's serum above 1 : 100 could alone be looked upon as diagnostic of dysentery ; in the case of Shiga a very much lower titre was significant, namely 1 : 30 and upwards. Ravaut lays stress on the fact that in the case of the Flexner-Y group, the different strains vary very considerably in their agglutinability, some being agglutinated by normal sera and *especially by sera rich in typhoid and paratyphoid agglutinins*, up to a titre of 1 : 300. It is therefore necessary for each laboratory to ascertain the sensitiveness of its stock Flexner-bacillus by testing it on as many known non-dysenteric sera as possible. In addition to this the titre of a patient's serum should be pushed to its utmost limit, since if a high titre is found it strengthens our conviction that the case is definitely one of dysentery.

E. E. A.

HANDMANN (E.). **Zur Diagnose und Therapie der Bazillenruhr.** [Diagnosis and Treatment of Bacillary Dysentery.]—*Deut. Med. Woch.* 1916. July 27. Vol. 42. No. 30. pp. 908–909.

Failure to find dysentery bacilli in the stools of dysentery patients has in the past been very disconcerting, so much so that some people have gone to the length of asserting that a bacteriological examination is no help and may be dispensed with. This is quite the wrong attitude. These negative results may be largely obviated by attending to two important points. In the first place dysentery bacilli stand cooling very badly ; secondly they are quickly overgrown by *B. coli.* It is therefore of paramount importance that the faeces should be delivered at the laboratory at the earliest possible moment and in a suitable condition. It is often necessary to send the specimen some distance for examination in which case the author has a suggestion to make. The particles of mucus may be separated from gross contamination with ordinary faeces by washing in normal saline warmed to 37° C. The mucus is then put in a small glass bottle which is inserted in a Thermos flask containing water at 40° C. It can then be sent considerable distances with a good chance of success, where the ordinary transmission through the post would fail. The same procedure is appropriate for amoebic cases.

The author concludes with a recommendation for the administration of Bolus alba. On the previous evening the bowel is thoroughly

cleared by means of castor oil, unless one can be sure that it is already in this condition on account of numerous stools having been passed. The first thing next morning the patient takes 100 grams Bolus alba in 150 cc. of water or weak tea; immediately afterwards an enema of 200 gm. Bolus in 400–500 cc. warm water is given, which should be held by the patient as long as possible—he is soon able to hold it until the same evening. No nourishment should be taken for at least two hours. In severe cases one should wait still longer and then give merely tea, red wine, mineral water and rice water, but no solid food. This treatment is repeated on three consecutive days and is usually followed by good results. Failing this it may be repeated after a pause of a week. The general condition, such as a tendency to heart failure, must of course be attended to, but the key-note of the treatment is *the administration of large quantities of Bolus simultaneously per os and per rectum in the early morning with an empty digestive tract.*

E. E. A.

FISHER (J. B.). **The Clinical Aspect and Treatment of Acute Bacillary Dysentery.**—*Brit. Med. Jl.* 1917. Jan. 13. pp. 43–46.

Cases of acute bacillary dysentery fall naturally into six groups.

1. *Catarrhal.*—Sudden onset with ten or more motions in first 24 hours. No blood passed. Distinguishable from simple gastro-enteritis by absence of vomiting and colic, a clean tongue, and preservation of a good appetite.

2. *Ordinary Ulcerative.*- Includes the majority of cases. Temperature 100°–103°. Some abdominal pain. Stools vary from 2 to 20 or 30 in the day and contain blood and mucus. Vomiting extremely rare; if present it indicates that the disease is of a fulminating type and anti-dysentery serum should be injected without delay.

3. *Toxaemic.*—Diarrhoea not a prominent symptom. Toxaemia may be so intense that a history is obtained from the patient with difficulty. He complains of headache and abdominal pain, and sleeps continuously for 24–48 hours if allowed to. During this stage there may be constipation, blood and mucus not appearing for two or three days.

4. *Fulminating.*—Temperature may be raised but patient is more often collapsed and gives a history of vomiting. Intense diarrhoea often going on to incontinence. Severe abdominal pain. Straining and tenesmus cause insomnia and restlessness so that morphia may be needed. Stools consist of blood-stained serous fluid sometimes resembling the urine of a case of acute nephritis. The patient has a bluish-red unhealthy flush on the cheeks not seen in a pure amoebic case. The only treatment is the *early* use of an anti-dysentery serum in large doses. We must always bear in mind that the case may be one of mixed bacillary and amoebic dysentery. The amoebic element may manifest itself four or five days after the serum has aborted the bacillary element. The same holds good when both emetine and serum have been given from the first, as the action of emetine on the amoebic element takes effect later.

5. *Choleraic.* Sudden onset with collapse and rice-water stools. This is a rarer type but is said to be quite common at the quarantine station at El Tor.

6. *Localised Attack.*—Patients in good health may pass formed stools coated with blood and mucus. The cases sometimes resolve in a day or two. The diagnosis depends upon the finding of dysentery bacilli in the faeces and the same applies to all these types.

Treatment. The principle in choosing a diet is to find one which is nourishing but does not leave much residue. Albumin water, barley water and lemon water are alone allowed for the first 48 hours. As the condition improves the diet is gradually increased.

Anti-dysentery serum should be given in sufficiently large doses. In severe cases 80 cc. are injected into the flank immediately, but the milder ones are left till next morning and then receive 40 cc.–60 cc. There should be no hesitation about giving further doses, say four doses spread over six or seven days, beyond which it is perhaps not worth while going.

In conjunction with this drachm doses of mag. sulph., three times a day for the first few days, help to get rid of the irritating material in the intestine and so reduce the diarrhoea.

E. E. A.

FINLAYSON (G. A.). **On the Treatment of Dysentery.**—*Brit. Med. Jl.* 1917. Jan. 13. pp. 46–48.

From his observations on cases at a base hospital the author is convinced that the right treatment of acute bacillary dysentery is the *intravenous* injection of 100 cc. of anti-dysentery serum, followed if necessary by another within 24 hours. Subsequent doses, say 40 cc. at a time, may be subcutaneous. In coöperation with this passive immunisation a magnesium sulphate mixture is administered. The extreme relief which the patients obtained from this treatment within 24–36 hours was most striking. The diet in the early stages consisted of albumin water, barley water, chicken broth and Brand's essence. Of nine cases so treated seven were due to *B. dysenteriae* Y and two to *B. dysenteriae* Shiga.

As regards the incubation period of dysentery due to the Y bacillus it was proved to be at least nine clear days in one case and at least six clear days in another.

E. E. A.

HUMMEL (Eduard). **Einige Fälle von Ruhrerkrankungen.** [Some Cases of Dysentery.]—*München. Med. Woch.* 1916. Sept. 19. Vol. 63. No. 38. pp. 1355–1356.

This is a note on a number of cases of dysentery caused by *B. dysenteriae* Flexner. Bacilli were isolated from the stools of practically every acute case *when plates could be inoculated not more than about two hours after the faeces were passed.*

Those cases which proved fatal were remarkable for the frequency with which the small intestine was involved in addition to the large intestine. These cases are unsatisfactory from the point of view of local treatment as the lesion in the small gut can be attacked neither from below nor above and they may therefore account for some of the chronic cases.

E. E. A.

LANCELIN (R.). **Recherches sur les lésions hépatiques dans la dysenterie bacillaire.**—*C. R. Soc. Biol.* 1917. Feb. 3. Vol. 80. No. 3. pp. 162–164.

In the course of an epidemic of bacillary dysentery at Brest during the summer of 1916 there were eight deaths, in seven of which lesions of the liver could be demonstrated. At the autopsy the liver was found to be generally enlarged, appeared congested and was a little softer than usual.

The histological lesions are usually profound, and the longer the liver has been subjected to the toxic process, the more pronounced they are. The cases may be divided into two groups according to duration of the illness.

(1) *Acute Intoxication.* One patient, a naval cadet of twelve years, died on the second day of the disease. The liver was increased in size, weighing 1,470 grammes. The microscopic lesions were not very marked, consisting of congestion and haemorrhage in the centres of the lobules accompanied by a slight infiltration of lymphocytes from the intertrabecular capillaries. The hepatic cells were normal in appearance and showed no fatty change.

(2) *Chronic*, in which death occurred between the 9th and 41st days. The central zone of the lobule was very little affected while the peripheral zone adjacent to the portal system was greatly modified, the cells being degenerated and showing fatty changes, and even at times a periportal sclerosis. The cell nucleus stained badly, was rounded and vacuolated, and often displayed a condition of karyolysis. The vessels were altered, especially the portal veins, which showed advanced endophlebitis and periphlebitis, but the biliary canaliculi were intact.

E. E. A.

STERNBERG (Carl). **Zur Bakteriologie und Aetiologie der Ruhr.** [Bacteriology and Aetiology of Dysentery.]—*Wien. Klin. Woch.* 1916. Oct. 4. Vol. 29. No. 40. pp. 1257–1262.

The war has widened our views regarding the aetiology of dysentery. In addition to bacilli of the well-known types, other undoubtedly pathogenic races have been isolated.

1. Bacilli which culturally agree with the Flexner type but are not agglutinated by a specific serum.

2. Bacilli which are agglutinated by a Flexner serum but do not conform to type as regards cultural characteristics.

3. Bacilli which are atypical in both respects but being the predominant organisms must be looked upon presumably as the cause of the disease.

The author agrees with other workers that the behaviour of the Flexner-Y group of organisms with maltose and saccharose is unstable and an insufficient basis for the separation of the three races Flexner, Y, and Strong. On the other hand the fermentation reactions on glucose, mannite and litmus whey are quite constant. A fact which has led to some confusion is that a dysentery serum obtained from the horse often agglutinates races of *B. coli* as well as the specific dysentery bacillus. The point to lay stress on is that both cultural and agglutination tests should be carried out before an organism is labelled *B. dysenteriae.*

E. E. A.

FRIEDEMANN (U.) & STEINBOCK. **Zur Aetiologie der Ruhr.** [The Etiology of Dysentery.]—*Deut. Med. Woch.* 1916. Feb. 24. Vol. 42. No. 8. pp. 215–218.

Out of 335 stool examinations of dysenteric patients, dysentery bacilli were found only 29 times. It must be remembered that the specific bacilli tend to disappear from the intestine in the later stages of the disease; many of these cases were ill for some time before reporting sick. In five cases which died and showed typical dysenteric lesions an attempt was made at the autopsy to isolate dysentery bacilli but without avail.

Agglutination is no help to the clinician in the acute stages as it is not developed until the third or fourth week of the disease. It is however useful for determining the etiology of the disease later on. *Coarse* clumping is alone diagnostic. The serum of a typhoid convalescent often gives *fine* clumping with Shiga. In a few cases the agglutination of *B. dysenteriae* Flexner was as marked as that of Shiga, but this must be looked upon as an instance of para-agglutination of Flexner by a Shiga serum because it is a well known phenomenon and the converse, namely the agglutination of Shiga bacilli by a Flexner serum, never occurs.

Although the isolation of dysentery bacilli from the faeces gave mostly negative results, yet the agglutination test showed at least 82 per cent. positive cases, of which 77 per cent. were Shiga. These were soldiers from the Eastern Front.

E. E. A.

D'HÉRELLE (F.). **Contribution à l'étude de la dysenterie. Nouveaux bacilles dysentériques, pathogènes pour les animaux d'expérience.** —*Bull. Acad. Méd.* 1916. Nov. 28. Vol. 76. No. 47. pp. 425–428.

A bacteriological examination of 40 stools from patients with dysenteric affections, contracted in France, was made. Seventeen of the patients were civilians and 23 were soldiers. The bacteria isolated fall into three groups.

1. *B. faecalis alkaligenes* (2 cases).—This bacillus constituted about 96 per cent. of the intestinal flora in one case, and 90 per cent. in the other, which in the opinion of the author justifies the view that the organism is pathogenic.

2. *Dysentery group* (21 cases).—The strains isolated were :—

Gay and Duval	1
Shiga	8
Y	6
d'Hérelle	6

The last named differs from the Flexner type in producing a transient acidity in a galactose medium which becomes distinctly alkaline again in 24 hours, whereas Flexner ferments this sugar strongly. Neither have these two types any agglutinative affinity. The author has lately succeeded in showing that his bacillus is pathogenic for mice.

No organisms of the type Flexner were found.

3. *Morgan group* (17 cases).—This is a rather heterogeneous group and three sub-types were isolated.

Six strains fermented, with gas production, glucose, maltose and mannite, but not saccharose or lactose.

Six strains fermented, with gas, all the sugars except lactose, agreeing with No. 29 of Morgan.

Five strains only fermented glucose. These bacilli resembled Morgan's No. 1 bacillus except that they produced acid in litmus whey, while the latter produces alkali.

It is possible that the abnormal conditions due to the war have modified to some extent the aetiology of bacillary dysentery.

[The author was astonished to find no Flexner bacilli in any of the faecal examinations, but we must remember that for practical purposes there is hardly any difference between this strain and *B. dysenteriae* Y which was found six times.]

FLU (P. C.). **Over het voorkomen van *Bacterium dysenteriae* Flexner in het bloed van patienten.** [On the Occurrence of B. Flexner in the Blood of Patients.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. No. 6. pp. 922–927.

Short notes on the occurrence of dysentery bacilli in the blood of patients. Details are given of one case in a child aged 4 years, who was suddenly taken with febrile symptoms, suggesting enteric fever. The spleen was not enlarged, and repeated examination of the blood for malaria parasites gave negative results. Constipation was present, but at the beginning of the illness the child had passed a large motion with blood and mucus. A blood-culture made for *B. typhosus* proved negative, but a sub-culture on agar gave a pure growth of Gram-negative non-motile bacilli, which did not develop gas either in glucose or lactose broth, turned litmus-whey slightly acid, and left neutral-red glucose-broth unaltered. Milk was not coagulated and no indol was formed. On litmus-mannite and litmus-maltose-agar red colonies developed, but on litmus-saccharose-agar the cultures remained blue. A diagnosis was consequently made of B. Flexner. On the 9th day of the illness the patient's serum was tested against *B. typhosus*, *B. paratyphosus* A and B, and B. Flexner, and while the first three proved negative B. Flexner responded in a strength of 1 : 500. The disease was consequently diagnosed as a blood-infection with the latter. The patient remained constipated during the rest of her illness, the bowels being only opened by means of enemata. Repeated examination of the motions so obtained revealed no Flexner bacilli. The author goes on to discuss the reports of other similar cases which have been published by different observers.

J. B. Nias.

DUENNER (Lasar) & LAUBER (Ilse). **Unterschiede in der Agglutinabilität verschiedener Ruhrstämme und deren Bedeutung für die serologische Diagnose der Ruhr.** [Variations in the Agglutinability of Different Dysentery Strains and their Significance in the Serological Diagnosis of Dysentery.]—*Berlin. Klin. Woch.* 1916. Nov. 20. Vol. 53. No. 47. pp. 1266–1267.

In the case of the dysentery group of bacilli, recent research has tended to show that coarse clumping is specific and fine clumping non-specific. Some interesting points are brought to light by the

authors' experiments. As is well known they found that the agglutinability of different strains varied greatly, so much so that one very susceptible race of Shiga bacilli was agglutinated by the sera of patients who were certainly not suffering from dysentery, even in a dilution of 1 : 80. Another anomaly was discovered in the Flexner-Y group. Of a number of strains of bacilli, that one which was agglutinated most easily with one specific serum was sometimes found to be the most difficult to agglutinate with another specific serum.

All this goes to show that we should take the greatest care in selecting the strain of dysentery bacillus which we are going to use for routine diagnostic purposes. The desiderata are, therefore, that the strain should not be too easily agglutinable, in order to obviate the possibility of its being clumped by normal sera, and also that it should be agglutinated by as many specific sera as possible.

E. E. A.

DOLD (Hermann). **Vier weitere Fälle von natürlich erworbener bazillärer Dysenterie beim Hunde, nebst Beobachtungen über Bazillenträgertum.** [Four Further Cases of Naturally acquired Bacillary Dysentery in the Dog, with Observations on the Carrier State.]—*Deut. Med. Woch.* 1916. July 6. Vol. 42. No. 27. pp. 811–813.

This investigation was carried out at Shanghai, China. Of seven sporting dogs suffering from diarrhoea, four were shown to be harbouring dysentery bacilli.

1. One and a half years old. Had passed blood and slime per rectum for many weeks. *B. dysenteriae* Flexner was found in the faeces. The dog's serum agglutinated this organism in a 1 : 300 dilution. Amoebae, indistinguishable from the pathogenic variety, were also present. Subsequent history of this dog not known.

2. This four-year-old dog had been passing blood and mucus for two weeks. *B. dysenteriae* Y isolated from faeces, which was agglutinated by the animal's blood. Recovered.

3. Flexner was isolated in this case. The eggs of *Schistosomum japonicum* were also present in the faeces but they were probably of no pathological significance. Recovered in about a week.

4. Two years of age. Blood passed for two weeks. The animal was very ill and had 4–5 motions daily. It died but unfortunately there was no autopsy. *B. dysenteriae* Shiga was isolated from both faeces and blood before death and the serum of the dog agglutinated both strains. No amoebae were found in this case.

Another dog was fed with a culture of *B. dysenteriae* Y, which was mixed with its ordinary food. The animal did not develop dysentery, but passed the bacilli in its faeces for at least three months. Dysentery bacilli were also demonstrable on the tongue for 13 days after infection.

If dogs can become carriers the danger to man is obvious. [Re amoebic dysentery in dogs see summary, Vol. 8, p. 444, of this *Bulletin.*]

E. E. A.

Mixed and Unclassed Dysentery.

Morison (J.) & Keyworth (W. D.). **Flies and their Relation to Epidemic Diarrhoea and Dysentery in Poona.**—*Indian Jl. Med. Res.* 1916. Apr. Vol. 3. No. 4. pp. 619–627. With 3 charts.

The correlation between diarrhoeic complaints and the presence of quantities of flies was very close during the earlier part of the monsoon at Poona in India, so much so that flies were generally looked upon as the chief agent in the spread of these diseases. Careful scrutiny of the deaths however revealed the fact that the plague of flies ceased before the end of the epidemic. By treating the water-supply with hypochlorite of lime in 1915 the annual epidemic was so reduced in size that the pollution of the drinking water by surface water during the rainy season must be considered to be the real means by which the infection is spread. The authors think that flies play little or no part in the process.

E. E. A.

Ficker (Martin). **Sobre a dysenteria em São Paulo.** [Dysentery at San Paulo, Brazil.]—*Ann. Paulist. Med. et Cirug.* 1915. Aug.-Oct. Vol. 5. Nos. 2, 3 & 4. pp. 335–339.

Notes on the laboratory examination of the stools of 260 cases of dysentery sent for examination to the Bacteriological Institute of San Paulo, between May, 1914, and August, 1915. The result was as follows:—

Amoebae of dysentery present	91	cases.
B. Shiga-Kruse	2	,,
B. Flexner	8	,,
Other bacilli of the same group not properly identified	4	,,
Paratyphoid bacilli	2	,,
Ankylostomiasis	5	,,
Taenia	1	,,
Ascaris	2	,,
Tricocephalus	6	,,
Flagellata (various)	22	,,
Negative	111	,,

J. B. N.

Kennedy (Alex. Mills) & Rosewarne (D. D.). **Observations upon Dysentery Carriers.**—*Brit. Med. Jl.* 1916. Dec. 23. pp. 864–867.

During the winter of 1915 about 5,000 examinations of faeces of dysentery cases, some of them repetitions, were made at the Royal Herbert Hospital, Woolwich. Only six bacillary carriers were detected, three of which were Shiga, all from Gallipoli, and three were Y, two being Gallipoli cases. One of the Shiga cases was associated with *E. histolytica*, and curiously enough this was the one with the mildest symptoms. In no other cases were *E. histolytica* cysts found.

In addition to these 5,000 examinations, 24 carriers of *E. histolytica* cysts were under observation; 14 of these came from Gallipoli. Nothing new is related regarding these cases.

E. E. A.

Koch (Jos.). **Zur Epidemiologie und Bekämpfung der Ruhrerkrankungen im Felde.** [Epidemiology and Control of Dysentery in the Field.]—*Deut. Med. Woch.* 1916. Feb. 17. Vol. 42. No. 7. pp. 183–188.

Among the soldiers of the "Landwehrkorps" in South Poland dysentery was about the only malady of any moment during August, September and October, 1914. The epidemic reached its maximum in September, declining rapidly as the cold weather came on. The same thing was repeated in 1915. Dysentery is essentially a disease of flat country, of villages, and small towns which in Poland have a rural character. In the larger towns such as Czenstochau and Kielce it never rises to the dignity of an epidemic, while the cases are confined to the suburbs which are inhabited by a more rural population. Dysentery is a very uncommon disease in the big towns of Germany. In Poland and Russia it is endemic so that troops readily become infected. The hygiene in these countries is at a very low ebb. Faeces are usually deposited on the surface of the soil, and the rain washes them into the drinking wells hard by. It is interesting to note that in a country like Poland where there is no central water system, an epidemic does not start with a rush. Another important factor in a region where the soil is contaminated with infected faeces, is the presence of flies.

In the case of a dysentery epidemic the number of carriers is high, so much so that the greater part of the population is infected without really being ill. Catarrh of the digestive tract, which is so common in the hot months, predisposes to an attack. This condition may be brought on by large draughts of cold water, a diet containing too much fat in the hot weather, unripe fruit, sudden change of diet as when an army is on the move, or by alcoholic drink. The bacilli survive longer in summer in deposited faeces and contaminated water. If there are no good latrines, a state of affairs which cannot be avoided in an advance, each man should be instructed to bury his excrement so deeply below the surface that rain cannot wash it into the drinking water. If this is done the fly danger is simultaneously done away with. Where this is impracticable faeces should at least be immediately covered with earth or sand.

E. E. A.

Dorendorf & Kolle (W.). **Klinische und bakteriologische Beobachtungen über Ruhr während des Sommerfeldzuges einer Armee in Galizien und Russisch-Polen.** [Clinical and Bacteriological Observations on Dysentery during the Summer Campaign of an Army in Galicia and Russian Poland.]—*Deut. Med. Woch.* 1916. May 11. Vol. 42. No. 19. pp. 561–564.

This description of a dysentery epidemic does not differ in any material points from the usual type. Although it was extremely infectious, the usual dysentery bacilli could hardly ever be

demonstrated, nor could any other bacterium be shown to be the predominant organism. An interesting fact was that some horses, which had drunk water known to be infected, exhibited somewhat similar symptoms. The importance of this article lies in the views expressed, which coming from such an authority on bacteriology as Kolle should bear some weight. It is suggested that this epidemic in Galicia and Poland was probably caused neither by an amoeba nor by a bacterium, but by some infective agent quite unknown. It is further hinted that bacilli of the Flexner-Y type may very well be, in reality, merely saprophytes revelling in an intestinal mucosa damaged by some other organism.

[In connexion with these revolutionary views it is worth mentioning that swine fever was at one time thought to be certainly caused by *B. suipestifer*, a bacillus frequently found in the intestine in cases of this disease, but was ultimately proved to be due to a filter-passing organism.]

E. E. A.

RUMPEL (Th.) & KNACK (A. V.). **Dysenterieartige Darmerkrankungen und Oedeme.** [Intestinal Affections and Oedema of Dysenteric Origin.]—*Deut. Med. Woch.* 1916. Nov. 2 & 9. Vol. 42. Nos. 44 & 45. pp. 1342–1344 & 1380–1383. With 1 chart.

Epidemics of oedema of unknown origin occurred in Napoleon's campaign against Russia, and have been noted also in other wars since. The authors met with it amongst the Russian prisoners in certain concentration camps in Germany. Taking the form of extensive swellings of the foot and leg, it started in one of the camps in December, 1915, and the number of cases increased until about the middle of February, 1916, when the epidemic began to decline, the cases becoming more sporadic. In April it began to be associated with dysenteric diarrhoea which was not present hitherto.

General description.—The swelling was situated chiefly on the feet and legs. The scrotum was never involved. A little ascites was common. A few of the cases also had swelling of the face, particularly the eyelids. Only two cases out of 54 exhibited swelling of the hands and forearms. Two cases showed pleural effusion. The oedema disappeared during the first few days of rest in hospital, with the excretion of enormous quantities of fluid by the kidney. There was a slight evanescent rise of temperature in most cases. A non-organic mitral and pulmonary systolic murmur was often met with. A most striking thing was the low blood pressure—as a rule it was 95 mm. Hg., and in some cases the systolic pressure was only 75 mm. Hg. Normal blood pressure was only rarely found. In a case exhibiting oedema of unknown origin beriberi should always be excluded. In this disease there is a disturbance of the reflexes owing to the peripheral nerves being involved. The urine was increased in amount corresponding with the draining of the oedematous tissues. There was an increased excretion of total phosphates. Only about half the cases showed a slight trace of albumin, which was compatible with healthy kidneys. There was a mortality of 7·4 per cent. With suitable diet the diarrhoea rapidly disappeared, lasting more than one or two weeks in very few of the cases. On the other hand the

patients regained their normal weight very slowly in spite of a nutritious diet. Exacerbations of diarrhoea of short duration during convalescence were common. After discharge from hospital the men were very liable to relapse. Although the greatest care was taken in the bacteriological investigation of the faeces no definite positive result was obtained. Flexner's bacillus was isolated on one occasion and *B. paratyphosus* B on another. In order to be sure that the material was obtained perfectly fresh, the authors went to the length of injecting a nutrient broth medium high up into the bowel, which was returned mixed with faeces. Plate cultures were made immediately from this and also after 24 hours incubation at 37° C. No pathogenic bacteria were found, nor were amoebae discovered. Blood cultures were sterile. Malaria and recurrent fever were excluded. The Widal reaction did not throw any further light on the matter. As the result of four autopsies the rather startling fact was brought to light that the patients had old dysenteric lesions, estimated to be at least four months old. This discovery induced the authors to examine 54 cases rectoscopically. All but three showed lesions of more or less severity.

E. E. A.

VON HANSEMANN (D.). **Ueber die Bedeutung der anatomischen Diagnose der Ruhr.** [The Significance of the Anatomical Diagnosis of Dysentery.]—*Berlin. Klin. Woch.* 1916. Oct. 30. Vol. 53. No. 44. pp. 1185–1187.

After describing the usual post-mortem appearances found in a case of dysentery, the author proceeds to contrast the local lesions due to other causes.

Mercurial Enteritis.—This occurs in cases of suicide, or in patients who have idiosyncrasy to mercury. Its characteristic is the intense nature of the local lesion. It not only spreads deeply into the tissues but also involves a very considerable extent of the gut, even stretching to the duodenum. The milder forms, such as are sometimes seen for example after the therapeutic use of calomel, can closely simulate the dysenteric condition.

Toxic Enteritis, caused by putrid meat, toxic fungi, unripe fruit, etc. In typical cases the lesions in the large and small guts are patchy in character. At one spot the follicles and Peyer's patches are swollen; at another, irregular superficial ulcers are present. The characteristic which distinguishes it from true dysentery and other forms of enteritis is the varied nature of the lesions.

To this category belong uraemic and septic enteritis. The former is usually quite superficial in character, often not extending to the submucosa. It is not always confined to the large intestine; the small intestine is sometimes alone affected. The tendency to form ulcers is very slight, presumably because the condition only appears shortly before death. Septic enteritis is characterised by a pseudomembrane composed of fibrinous exudate, pus and epithelial cells, which ends in the formation of irregular ulcers. The seat of the trouble is almost exclusively the large gut.

Enteritis due to Castor Oil.—This is a very rare condition but a few patients have an idiosyncrasy to this drug, which may cause death.

When dysenteric ulcers are healing it may be very difficult to differentiate them from those due to so-called ulcerative colitis, syphilis, or tuberculosis. The history of the case is the only guide.

E. E. A.

HOLLAND (C. Thurston). **Report on the X-Ray Examination of Dysentery and Other Cases.**—*Ann. Trop. Med. & Parasit.* 1917. Feb. 8. Vol. 10. No. 4. pp. 357–359.

In a paper entitled "Bismuth-X-ray Localisation of Dysenteric Ulceration" [see this *Bulletin*, Vol. 7, p. 236] GLASSON advocates the use of bismuth subnitrate for the diagnosis of dysenteric ulceration. Holland combats this view, maintaining that the appearances do not differ from those obtained in normal cases, and scouts the idea that the method is of any use for the diagnosis of ulceration of the intestine.

E. E. A.

LESIEUR (Ch.). **Entérites simples et dysenteries. Notes cliniques et bactériologiques.**—*Paris Méd.* 1917. Jan. 27. Vol. 7. No. 4. pp. 69–74.

This paper consists mainly of a description of a number of manifestations other than intestinal, which may appear in the course of diarrhoeic conditions, but its value is largely discounted by the fact that no distinction is made between simple gastro-enteritis, dysentery and other complaints of a similar nature, which are distinct clinical entities. They are as follows :—

Skin lesions.—Herpes, urticaria, purpura, conjunctivitis.

Muscular and joint.—Pains in joints and muscles; cramps.

Nervous system.—Vasomotor disturbance; tetany; tremors.

Circulatory system. Doubling of the second heart sound; bradycardia.

Kidneys.—Albuminuria, etc.

E. E. A.

CARLES (Jacques). **Fièvres paratyphoïdes et dysenteries.**—*Progrès Méd.* 1917. Feb. 10. No. 6. pp. 45–46.

The association of paratyphoid fever and dysentery occurs occasionally. The former being cured it is essential to give emetine or antidysenteric serum, as the case may be, in order to disperse the dysenteric element. In these cases paratyphoid fever appears to be endowed with a degree of severity which it does not possess in its unalloyed state. A case is cited. The patient, 28 years of age, had never been inoculated against typhoidal diseases. He showed the classical symptoms of a paratyphoid infection, with a positive Widal reaction for paratyphoid A and B. The temperature died down but the patient did not get better. The number of stools began to increase, reaching as many as 30 in the 24 hours, and the patient was seized with vomiting. As the blood agglutinated Shiga's bacillus, 20 cc. of antidysentery serum was injected which caused the frequency of the

stools to drop suddenly from 20 to 3. Four further injections were given and the man made an uninterrupted recovery. Another case exactly similar, except for the substitution of typhoid for paratyphoid, is recorded.

E. E. A.

RIST (S.). **Arthropathies et conjunctivites dysentériques.**—*Bull. Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Nov. 9. Vol. 32. 3 ser. No. 29–30. pp. 1762–1765.

In a district where a dysentery epidemic is raging, all cases of arthritis should be considered to be possibly of dysenteric origin, and the faeces should be bacteriologically investigated with this in mind. The true interpretation of these lesions is often missed for two reasons :

(1) The joint lesion almost always makes its appearance after the intestinal symptoms have completely cleared up –the interval may be as long as two or three weeks with intervening good health.

(2) Arthritis often occurs after a mild attack of dysentery, so trivial indeed that the doctor has not been consulted.

The form taken by this complication of bacillary dysentery sometimes resembles acute rheumatism in that many joints are affected, but all the symptoms are less intense ; at other times a single joint is picked out such as the knee, elbow, or hip-joint. The arthritis is accompanied by a rapid and often considerable muscular atrophy which may be prolonged for several weeks and cause anchylosis. Cardiac complications have not been met with. The fluid from five cases of arthritis of the knee was examined. Numerous polynuclear leucocytes were found but no bacteria. Salicylates have no effect whatever on these arthropathies. Anti-dysentery serum given early and in large doses (50–60 cc.) causes the pain to disappear in 24 hours and if persisted with for three or four days, the joint becomes completely normal again.

A rather rare complication of bacillary dysentery is double conjunctivitis appearing during convalescence. It is a curious fact that there seems to be a kind of complementary balance between these two complications—arthritis and conjunctivitis. As soon as the conjunctivitis disappears, the arthritis is noticed and it has even been observed that the former reappears when the joint gets well.

E. E. A.

CROUZON (O.). **La conjonctivite et le rhumatisme dysentériques.**—*Bull. Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Dec. 7. Vol. 32. 3 ser. No. 33–34. pp. 1926–1928.

The author has lately seen 420 cases of clinical dysentery. Strange to say, in none of these were *E. histolytica* or dysentery bacilli found. Nine cases of rheumatism were observed. The joints most frequently involved were the knee and ankle, and sometimes the elbow and shoulder. In a few instances it was a question of an old rheumatism being lit up again. In some cases the lesion appeared about 8–10 days after the injection of anti-dysentery serum which lead the author to believe at first that it was caused by the horse serum, but this view was abandoned when it was observed that arthropathies were occurring in patients who had not had any injection.

Several ocular lesions, such as paresis of accommodation, retinal haemorrhage, etc., are known to occur in association with dysentery, but conjunctivitis has apparently not been hitherto observed. It may occur before or after the rheumatism, or even without it. In the absence of rheumatism the conjunctivitis appears after about ten days; when it accompanies rheumatism it is usually first noticed at the end of a fortnight.

The conjunctivitis is double and not accompanied by a mucopurulent discharge. No bacteria are found in the secretion. The inferior palpebral conjunctiva is most commonly affected. The condition clears up spontaneously without treatment at the end of 6–8 days.

Bearing in mind the association which exists between rheumatism, conjunctivitis and dysentery, it is possible to diagnose a number of cases of dysentery which would otherwise have escaped unnoticed, and this is important from the point of view of detecting carriers.

E. E. A.

MOREAU (Laurent). **Arthrites du genou d'origine dysentérique.**—*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 10–12.

Arthritis of the knee in the course of an attack of dysentery is comparatively rare. This articulation may be attacked suddenly, or it may follow polyarticular pseudo-rheumatism, the other joints only being slightly affected. Dysentery complicated by arthritis occurs about once in 38 cases, according to KELSCH and KIENER. The two cases here reported were both cases of bacillary dysentery contracted in the neighbourhood of Salonika and Corfu respectively. Each of them had a considerable amount of effusion into the joint. In one, the knee alone was affected; in the other the wrist was also involved.

MORAX stated that ocular symptoms sometimes accompany these articular lesions. They consist in conjunctivitis and iritis.

E. E. A.

EVANS (T. J. Carey). **Clinical Observations on Dysentery.**—*Brit. Med. Jl.* 1917. Mar. 31. pp. 418–420.

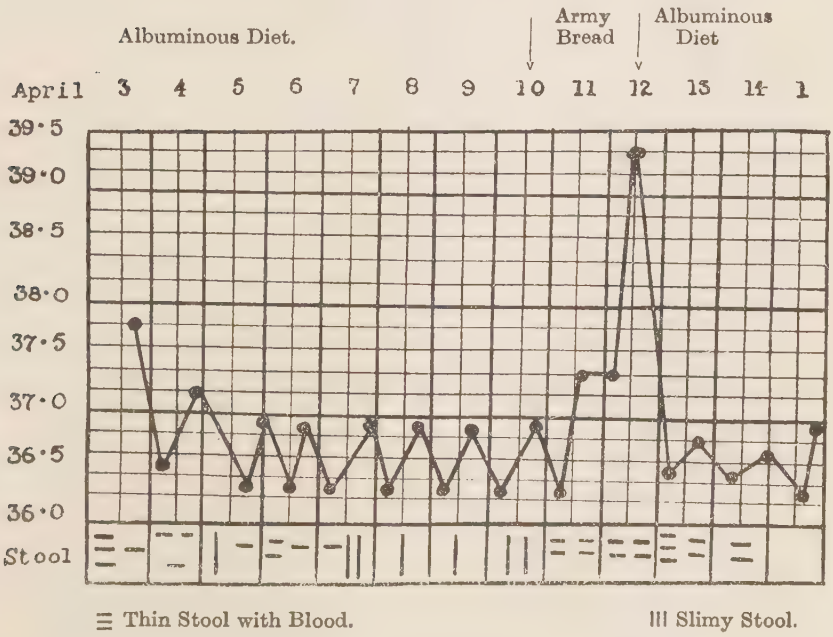
Most of the observations in this paper are not supported by reliable evidence. Bacteriological examinations were not carried out. The author says, for example, that in all the military expeditions with which he has been associated (India, Egypt, Anzac, Mesopotamia), bacillary dysentery has prevailed in the beginning while the troops were collecting at the base, to be followed by amoebic dysentery later on when the armies were advancing. But this is based upon the author's claim to be able to distinguish between the two varieties of dysentery purely from clinical observations. This is the first time, to the writer's knowledge, that anyone has put forward such a claim and as the points of distinction are not given it cannot be accepted.

E. E. A.

MEYER (Ludwig F.). **Zur Diätetik der Ruhr.** [Diet in Dysentery.]—*Deut. Med. Woch.* 1916. Mar. 23. Vol. 42. No. 12. pp. 349–351. With 5 charts.

The usual diet of a dysentery patient is a starvation diet. It is far from supplying the requisite number of calories for the maintenance of equilibrium between the anabolic and catabolic changes. The patients have as a rule been partially starved before their admission to hospital, and to continue this state of things by giving a low diet is not to give the man a fair chance in the desperate struggle with the infective agent. It is quite likely that many of the symptoms which have hitherto been credited to the disease itself are in reality directly due to the want of sufficient nourishment, such as loss of appetite, weakness, wasting, depression of heart and circulation. Last but not least the immunity the patient is capable of developing is diminished, as is clearly shown in animal experiments. The ordinary sloppy food given to a dysentery patient is rich in carbohydrate. Now carbohydrates have a tendency to cause looseness of the bowels whereas proteins have the opposite effect, and for this reason combined with their more nourishing properties the latter are more appropriate in acute dysentery. Carbohydrate-containing foods such as bread must not be given too early. The accompanying chart shows a case of "alimentary fever."

Alimentary Fever in Convalescent from Dysentery.



≡ Thin Stool with Blood. ||| Slimy Stool.

The temperature dropped again as soon as the bread was discontinued.

E. E. A.

ROSTOSKI. **Zur Behandlung der Ruhr.** [Treatment of Dysentery.]—*Berlin. Klin. Woch.* 1916. Nov. 13. Vol. 53. No. 46. pp. 1235–1236.

When a dysentery patient has reached a hospital he should remain there. He should be kept strictly in bed, and this refers to mild cases also. The abdomen must be kept warm with a binder or other suitable means. There has lately been a reaction from the low sloppy diet which has hitherto been the lot of the dysenteric patient. Several authors have pointed out that such a diet contains insufficient calories to give the patient the best chance of combating the bacterial invasion. They are in favour of giving a full protein diet from the very beginning. Rostoski now recommends a modification. For 1–3 days in the early acute stage no solid food is allowed, the fluid loss of the body alone being replenished. It is found that a rich diet can then be tolerated much better than when instituted from the beginning. A start is made with two or three eggs a day, supplemented gradually by other protein foodstuffs. The first principle is to avoid the production of much faecal matter. Carbohydrates should be withheld for some time, to avoid the fermented stools which are so liable to occur.

E. E. A.

CARTER (Henry F.), MACKINNON (Doris L.), MATTHEWS (J. R.) & SMITH (A. Malins). **The Protozoal Findings in Nine Hundred and Ten Cases of Dysentery examined at the Liverpool School of Tropical Medicine from May to September 1916 (First Report).**—*Ann. Trop. Med. & Parasit.* 1917. Feb. 8. Vol. 10. No. 4. pp. 411–426. With 1 chart.

Since 1st January, 1916, the number of cases of dysentery examined at the Liverpool School for protozoa in the faeces is 2,162, involving 8,158 examinations. The first 1,305 of these cases were included by FANTHAM (1916) [see this *Bulletin*, Vol. 8, p. 137] in a personal report which he published. The 910 dealt with here include 53 of the former owing to the fact that these patients remained on in hospital, and because they provided in some cases fresh positive findings after the date of publication of FANTHAM's report.

The results of this laborious and valuable investigation are set forth in easily accessible tabular form. Of the 910 cases 44·2 per cent. proved to be infected with protozoa. *E. histolytica* took third place in regard to frequency (10·3 per cent.), *Giardia intestinalis* second (18·6 per cent.) and *E. coli* first (25·4 per cent). A list is added showing the number of multiple infections and the organisms concerned in them.

The authors compare their results with those of other workers and with a previous report of their own. [See opposite page.]

Stress is laid upon the necessity for repeated examinations of each patient as cases found negative on first and second examinations may prove on further examination to be *E. histolytica* carriers. Examples of this are given, two infections with *E. histolytica* being found for the first time at the fourth examination and one for the first time at the sixth examination. If only three examinations had been made, six cases of *E. histolytica* would have escaped detection,

which is 6·4 per cent. of all the *E. histolytica* cases found. In a similar way other protozoa were commonly only found after repeated daily examination, as example of which the authors mention four cases of *E. histolytica* carriers in whom the presence of *Chilomastix mesnili* was first observed on the sixteenth, seventeenth, twenty-third and twenty-fourth examinations respectively.

Intestinal Protozoa found in Dysenteric Patients.

	Present Report 910 cases	Wenyon (1915) 556 cases	Dobell (1916) 200 cases	Jepps (1916) 426 cases	Smith and Matthews (1917) 250 cases
	1	2	3	4	5
E. histolytica ..	10·3	10·8	11·0	7·7	8·0
E. coli	25·4	39·0	40·9	25·8	19·2
G. intestinalis ..	18·6	16·0	19·5	19·0	8·0
T. intestinalis ..	1·2	1·6	2·4	—	1·7
C. mesnili	2·7	0·5	7·8	—	2·0

The important subject of "Negative periods" (absence of vegetative forms and cysts) in infected cases is dealt with, and some observations are given which the authors hope to amplify in a later report. *E. coli* in a number of patients remained absent for intervals of a fortnight (10–12 examinations). *G. intestinalis* showed less frequent and generally shorter negative periods. *C. mesnili* had negative periods of 7 to 16 days, in a few records. *Trichomonas intestinalis* infections were usually rather scarce and of comparatively short duration. One case however, of which a daily record was made, showed four distinct negative periods, two of 13 days, one of 14 days and one of nine days. A chart is given with curves showing the percentage increase in infections at each of six examinations for (a) cases infected with *E. histolytica*, (b) cases infected with *G. intestinalis*, (c) cases infected with *E. coli* and (d) total infected cases.

B. B.

SMITH (A. Malins) & MATTHEWS (J. R.). **The Intestinal Protozoa of Non-dysenteric Cases.**—*Ann. Trop. Med. & Parasit* 1917. Feb. 8. Vol. 10. No. 4. pp. 361–390.

Non-dysenteric patients to the number of 250, who were admitted to hospital for various causes, were examined as regards the presence of protozoa in their faeces; 30 per cent. were found infected, and as in a number of cases repeated examinations could not be made the authors consider that this figure is certainly too low.

Entamoeba histolytica was found in 8 per cent. of all the cases, *E. coli* in 19·2 per cent., *Giardia intestinalis* in 8 per cent., *Chilomastix mesnili* in 2 per cent. and *Trichomonas* in 1·7 per cent. 123 of the cases had been in districts where *E. histolytica* is known to be prevalent and if these cases are considered alone the percentage of *E. histolytica* infection rises to 15·4. The analysis of the 123 cases who had been

in a known endemic area shows that only 21 per cent. were suffering from intestinal complaints.

In discussing the 20 cases of *E. histolytica* infection discovered in the total 250 cases examined, it is pointed out that only three of them had a history of dysentery, while 17 had no history of dysentery, the latter being what DOBELL has termed "contact" carriers. [This term was used by WALKER & SELLARDS; see this *Bulletin*, Vol. 3, p. 65.] One of their tables shows for comparative purposes the protozoal findings by WENYON [see this *Bulletin*, Vol. 8, p. 136] in 556 dysenteric cases, Liverpool School [see above] in 910 dysenteric cases and the authors in 250 non-dysenteric cases. The figures for the non-dysenteric cases show a smaller number of infections than the dysenteric for each of the common intestinal protozoa, but the authors draw attention to the importance of the fact that they so nearly approach them.

The next portion of the paper is occupied by analyses, showing the incidence of parasites, grouping the patients according to their present complaints, intestinal and non-intestinal, their history—dysentery, diarrhoea or neither—and the regions in which they had travelled.

The *E. histolytica* cases are then studied in detail and attention is called to the occurrence of distinct negative periods up to a fortnight's duration in some untreated cases. In fact one case is mentioned in which the first examination revealed the presence of *E. histolytica* cysts, but 26 subsequent examinations were made extending over a period from 4th June to 18th September with negative result. This case is quite exceptional however. On the whole the records show that in untreated cases *E. histolytica* reveals itself at examination with remarkable constancy. In 395 examinations of the 20 cases of *E. histolytica*, cysts occurred 126 times and amoebae only three times.

Cases were encountered of infection with *E. coli* in patients from Canada and England, and of infection with Giardia in patients who had never been out of England.

B. B.

ROCHE (W.). **Intestinal Protozoa in Salonika War Area.**—*Lancet.* 1917. Feb. 24. pp. 297–298.

The author examined the stools of 893 cases of diarrhoea and dysentery among troops in the Salonika area, during the months August, September and October, 1916. The infections started about May and continued to the time of writing with slight variations, which the author explains as follows:—

"These variations, I think, are mainly due to climatic changes. The great spreaders of diarrhoea and dysenteries are flies. Heat and moisture are necessary for these pests to thrive. In the very hot spells, when everything was dried up, flies became less numerous. On the contrary, during a cold spell, their numbers were markedly diminished, and in these periods there was distinctly less diarrhoea and dysentery."

Bacillary dysentery was the predominant type, and although a number of acute amoebic cases occurred, the author considers it remarkable that there were not more, in view of the fact that many of the troops were carriers of *E. histolytica*. In a table there are

given the findings as regards protozoa in the 893 cases, as a result of 1,425 examinations. *Entamoeba histolytica* was found in 37 cases, *E. minuta* in 47. The author includes in the latter number besides *E. minuta*, a "specially small form of amoeba with its cyst" demonstrated to him in Egypt by Lt.-Col. WENYON, R.A.M.C., by whom it has been described [see above, page 405].

Flagellate protozoa occurred in 217 cases:—Lamblia (vegetative 29, cysts 44), Tetramitus (vegetative 72, cysts 18), Trichomonas 45, Cercomonas 9.

Coccidia were present in 18 cases (Isospora 15, Eimeria 3).

B. B.

DOBELL (Clifford) & LOW (George C.). **A Note on the Treatment of Lamblia Infections.**—*Lancet.* 1916. Dec. 23. pp. 1053–1054.

The authors investigated a single case of infection with *Lamblia intestinalis.* The subject was a carrier, being apparently healthy, and no other Protozoon infection was found in him. Before treatment his stools were examined daily for 100 days. On certain days parasites were present while on others they were absent, but no periodicity in the number of cysts voided was determined. [But only coverglass preparations were examined, and measured quantities of faeces were not used.] The supposed efficacy of various drugs was then tested. Bismuth salicylate 20 gr. and beta-naphthol 15 gr., made up in cachets, were given three times daily after food, the administration being continued for six days. The cysts disappeared during treatment and for six days afterwards, but then reappeared in the stools.

The action of methylene blue was next tried. Three grains of the zinc-free drug were administered thrice daily after food. The treatment was only able to be continued for two days owing to the appearance of toxic symptoms, chiefly manifested as bladder irritation. The drug appeared to have no effect. A turpentine mixture was then tried. 10 minims in gelatine capsules were given three times daily for five days, followed by guaiacol carbonate 5 gr. thrice daily for three days. However, the cysts did not disappear.

The authors have also examined other cases treated with various drugs, such as emetine hydrochloride, emetine bismuth iodide, bismuth subnitrate, thymol, salol, kerol, cyllin and liquid paraffin. These drugs did not appear to have had any effect on the parasite. The authors show the need for the daily examination of stools before, during, and for some time after treatment. The blood of the subject was also examined, and blood counts were made. The number of red corpuscles, white corpuscles and the differential leucocyte count were normal, while the haemoglobin was 100 per cent.

In conclusion, the authors rightly state that they do not wish to draw any far-reaching conclusions from the single case described. [The need for daily examinations of the faeces of Lamblia-infected patients and the occurrence of daily variations in the numbers of the parasites have already been emphasised by PORTER—see this *Bulletin*, vol. 8, p. 131–2.]

A. P.

MARSHALL (D. G.). **The "Toxic" Effects of Methylene-Blue.** [Correspondence.]—*Lancet.* 1917. Feb. 17. pp. 276–277.

The writer refers to the note summarised above. As a result of experiments carried out in India in 1893 he believes that methylene blue if free from chloride of zinc can be used in treatment without detriment to the patient. He quotes a recent case of Lamblia infection in which 9 grains per diem were given, in all 72 grains. There was no discomfort and at the time of writing only very few cysts could be detected after prolonged search.

A. G. B.